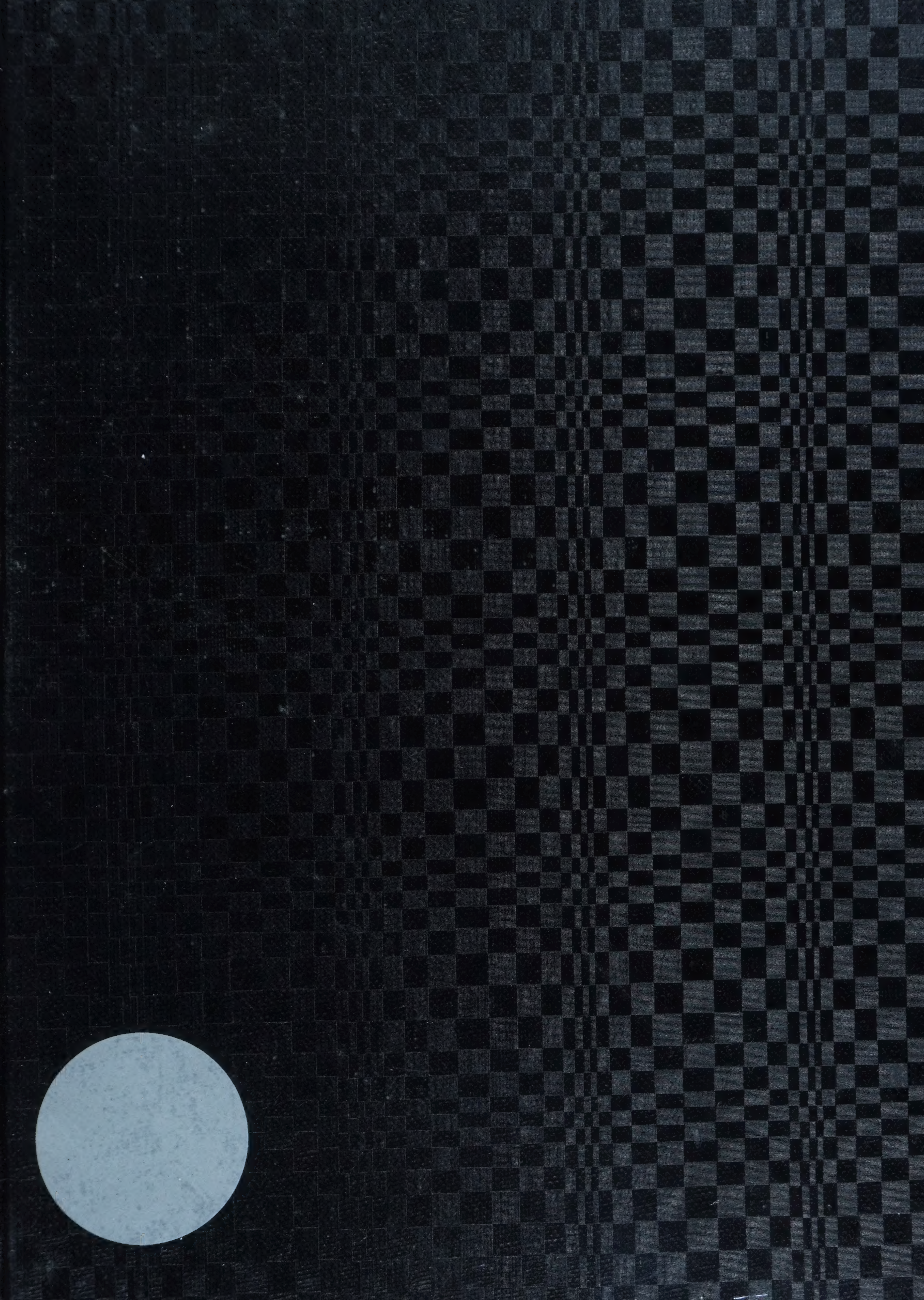

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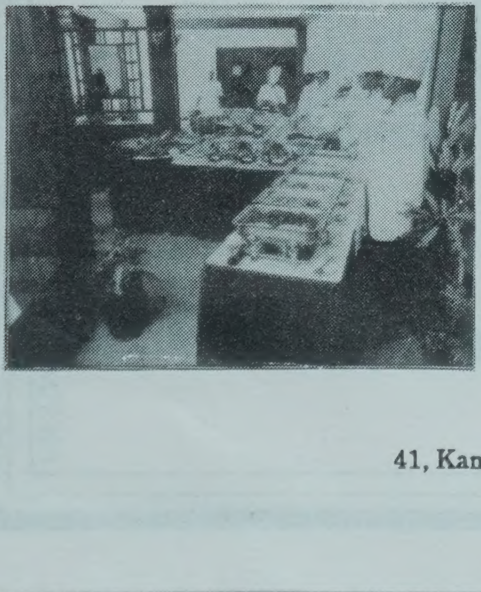

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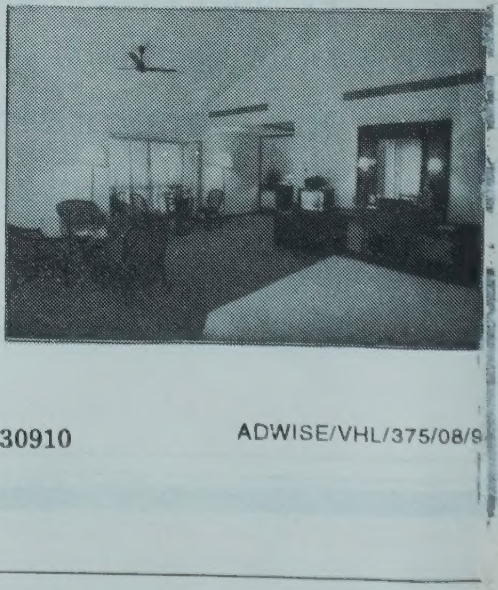

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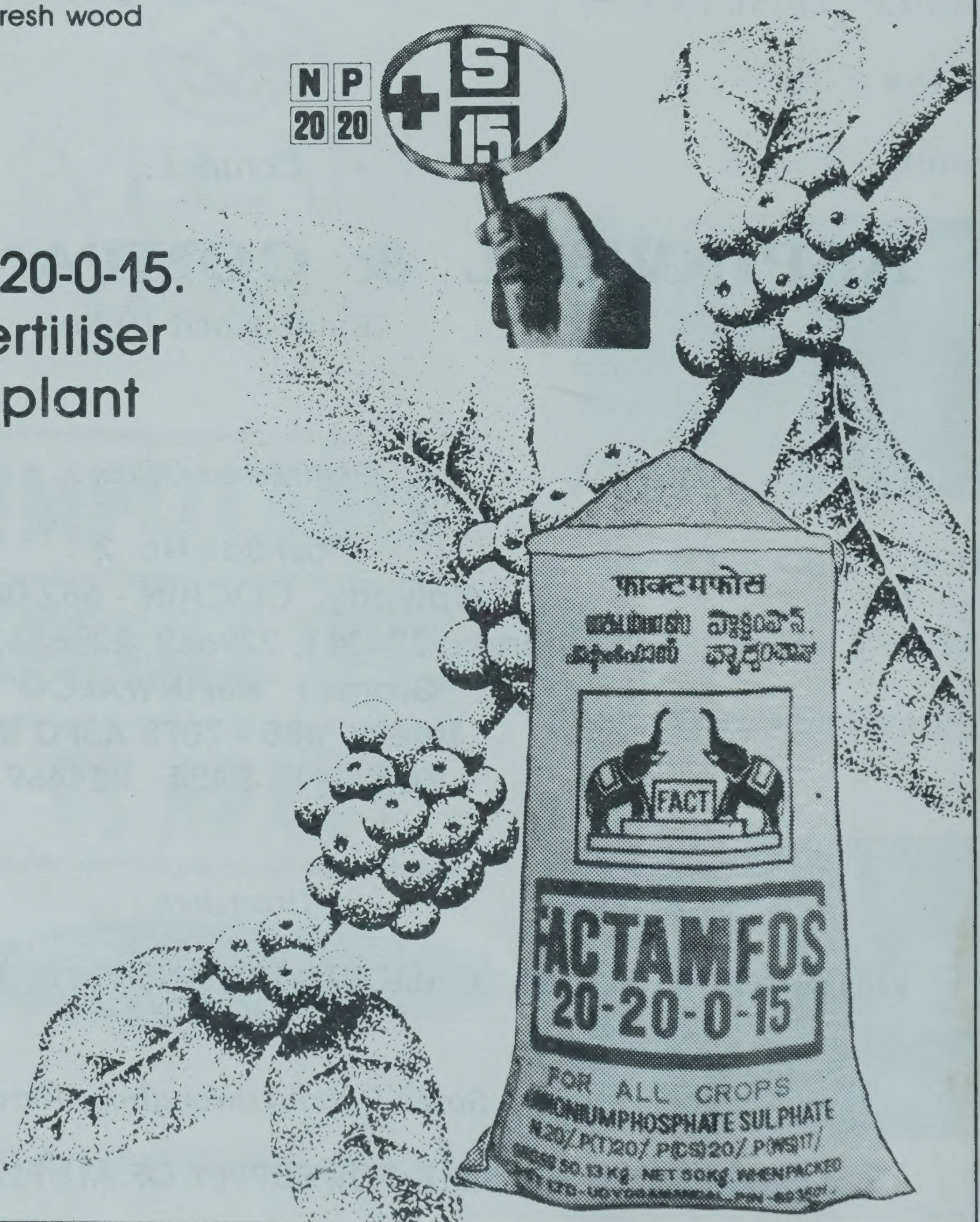

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EDITORIAL

USEFULNESS AND ACCEPTABILITY LEVEL OF IN-HOUSE MAGAZINE

Planting Opinion was started in 1895 by two brothers (Duff) from Coonoor as a private venture. It announced under its masthead that it was "Written by Planters for Planters". *Planting Opinion* was started just about the year after UPASI was formally inaugurated. The magazine was received very well by the planting community. Interesting and thought-provoking articles found place in the magazine. However, the magazine was closed down in 1902. Out of its ashes rose in the new avatar *"The Planters' Chronicle"* in 1906 as UPASI in-house publication.

In 1970, publication of the magazine was shifted to Delhi and further the *Planters' Chronicle* started being published jointly by the UPASI and Indian Tea Association. The magazine became the voice of Indian planting industry rather than that of South Indian planters. But from UPASI's point of view, it was losing touch with its membership — who considered the *Chronicle* a major source to them on what was happening in South Indian planting. Probably this led to the publication of the magazine being shifted back to Coonoor in April 1972 as the voice of South Indian planters.

We have now reached the cross-road in the publication of the *Planters' Chronicle.*

Last few years saw information and communication explosion. The number of newspapers and journals increased by leaps and bounds. Many newspapers started publishing from various centres. Faster mode of transport, be it by air or rail, is enabling the readers to get papers and journals without much delay.

And there is the new phenomenon of ubiquitous TV. In terms of speed, TV has transformed information spread from days and hours to on the spot, i.e., "live".

In yester-years, one could say with certainty that for the planting community the *Planters' Chronicle* was a media from which they received news about what was happening among the planters. With the lack of newspapers and journals and insufficient telephone system at that time, one could assume that planters eagerly waited for the arrival of the *Planters' Chronicle.*

Not so any more.

Editorial

That probably explains the dwindling number of subscription for the *Planters' Chronicle*. It could also be that the contents of the *Planters' Chronicle* are not what the planting community is looking for in a magazine of this type.

Could it be made more interesting? Should we reduce the number of articles? Would excerpts from newspapers on the planting industry be more interesting? What about statistics? Should we include production and export trend, etc. in the magazine?

What is suggested above is an illustrative list and not an exhaustive one. There must still be readers who love the magazine. Can we have their suggestion on making it more readable and interesting?

The dwindling number of subscribers is not merely applicable to the *Planters' Chronicle*, but also for *Industrial Relations Series* published by UPASI. How to increase the number of subscribers for these *Series* is also a matter on which we would like to have views of members. ✪

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EDITOR : D. Ravindran. Printed and published by Dr. D. Padmanaban at Kalaikathir Achchagam, Coimbatore 641 037.

Opinions expressed in this journal are not necessarily those of the UPASI.

COVER FEATURE

ORGANIC SPICES

By
KOSHY JOHN*

The spices among all the products of agriculture origin told us the most romantic stories of the ancient and medieval times. Of late, the awareness and, responses made the sophisticated consumers conscious of the hazards of inorganically produced foods. More and more consumers across the world are asking for chemical-free food for healthy growth. The coming up consumers particularly of the European community in the 21st century expect us to prepare for them more healthy and organically produced foods of which our spices remain as essential ingredients all the times. We must aim for futuristic spice trade.

Ecologically sustainable agricultural policy is the talk of the day. The famous green revolution is over. In this context, the place of organic production for export oriented captive farming with spices could assume importance soon in a third world country like India. The process of organic intensification of agriculture called 'involution' is in the developing stage. It needs a guarantee that assures the consumers of the organic origin and quality of the product on one hand, and that protects the production from false competition on the other hand. This guarantee is absolutely necessary to extend the market for organically grown and processed spice products.

The value of old forms for taste and nutritive value is now greately acknowledged. In contrast to chemical intensification strategy, onus here is for cost-effective sustainable farming with major consideration for taste and nutritive value. This article aims to stimulate the use of correct indicators which may become relevant to organic production methods of spices products in our country, by performing innovative initiatives.

ORGANIC PRODUCTION :

This is a distinctive farming for 'Production' shall mean the operations involved in producing the production in the farm.

---

* Jt. Director, Spices Board, Saklaspur.

'Preparation', the operations of processing, preserving and packaging of the production, 'Marketing', the holding or displaying for sale, offering for sale, selling, delivering or placing on the market in any other natural or legal person who produces, prepares or imports from a third country, with a view to subsequent marketing or organic products. Organic production, preparation, marketing, and operators are required to be certified by the agencies approved by the consuming countries. Organic production is done by the approved growers.

Organic farming is managed without using any chemicals or only using approved chemicals to help plant growth. Instead of fertilisers, a composite mixture of leaves, plant and animal wastes, green manure, farm yard manure, neem cake, etc. are used. For repelling pests, insecticides like neem-based pesticides are becoming popular. Vermiculture could also be a part in the organic system.

In the organic farms, the genetic diversity of plants plays ecological function like sharing of water, light, nutrients, etc. While life forms are grown together, nature provides for compensation of pest and disease attacks, nutrient deficiencies, pollination, etc. Organic production through 'involution' involves sustainable output as well as sustainable livelihood.

The principles of organic production methods further stipulate that production of any approved product of agricultural origin relates to a organic method of agricultural production which generally satisfied the rules of production and becomes eligible for certification in the inspection system as adopted by the European community for imports. Certification of approved organic products is thus essential for experts from the third world countries to the European community countries by the approved certifying agencies. There are certain stipulations imposed by the community on agronomic plant protection and marketing fronts for facilitating organic production from third world countries.

Sustainable agronomic aspects :

The organic production method implies :

- only products composed of substances permitted as plant protection product detergents, fertilisers or soil conditions be used.
- products whose use do not result in unacceptable effects on the environment or contribute to the contamination thereof only be used.
- the products are produced or prepared by operators where the fertility and the biological activity of the soil must be maintained or increased.
- by cultivation of legumes, green manures or deep-rooting plants in an appropriate multiannual rotation programme.
- by incorporation in the soil of organic material composted or not, and for compost activation used appropriate micro organic or plant-based preparations (biodynamic).
- by incorporation in the soil of products out of organic live stock production, including by-products from the livestock farming such as farm yard manure.
- by other organic or mineral fertilisers listed applied only to the extent that adequate nutrition of the crops being rotated or soil conditioning are not possible by the methods set out under the preceeding subparagraphs.

Organic or mineral fertilisers :

- Farmyard and poultry manure
- Slurry or urine
- Straw
- Peat
- Composts from spent mushrooms and vermiculture substracts
- Composts from organic households refuse
- Composts from plant residues
- Processed animal products from slaughter houses and fish industries
- Organic by-products of foodstuffs and textile industtries
- Seaweeds and seaweed products
- Sowdust, bark and wood waste
- Wood ash
- Natural phosphate rock
- Calcinated aluminium phosphate rock
- Basic slag
- Rock potash
- Limestone

— Chalk
— Magnesium rock
— Calcareous magnesium rock
— Gypsm (calcium sulphate)
— Epsom salt (magnesium sulphate)
— Stone meal
— Clay (bentonite, perlite)
— Sulphate of potash*
— Trace elements (boron, copper, iron, manganese, molybdenum, zinc)*
— Sulphur*

(*Need recognition by control body).

Sustainable plant protection methods :

Pest, diseases and weeds shall be controlled by a combination of the measures such as :

— Choice of appropriate species and varieties
— Appropriate rotation programme
— Mechanical cultivation procedures
— Protection of natural enemies of pests through provisions favourable to them, eg. hedges, nesting sites, release of predators
— flame weeding
— only in cases of immediate threat to the crop may recourse to the plant protection products listed.

Plant protection products :

Preparations on basis of pyretheins extracted from chrysanthemum cinerariaefolium, containing possibly a synergist.

— Preparation from Debris elliptica
— Preparations from Quassia amara
— Preparations from Rynia speciosa
— Propolis
— Diatomaceous earth
— Stone meal

Preparations on basis of metaldehyde containing a repellent to higher animal species and as far as applied within traps.

— Sulphur
— Bordeaux mixture
— Burgundy mixture
— Sodium silicate
— Sodium bicarbonate
— Potassium soap (soft soap)
— Pheromone preparations
— Bacillus thuringiensis preparations
— Granulose virus preparations
— Plant and animal oils
— Paraffin oil.

Export oriented captive farming :

There is awareness now world over for natural food products of agriculture origin. The demand for organic products is growing day by day in Europe and rest of the world. Spices being essentially food items, qualities of spices are important parameters for successful exports. Organically produced products will have an edge over inorganic products in the days to come. Presence of pesticide residues in the food products is very much feared. The accent, therefore, could be towards export oriented spices agriculture.

Export production units of spices with groups of farmers organised could be promoted in the villages for promoted in the villages for production of one or group of spices. It needs organic thinking, education and appropriate practices systematically inculated therein. The success depends on linkages to be established between production, preparation, inspection and marketing agencies within and outside the country. Towards this goal, principles of organic production need to have reoriented to suit our situations with bold initiatives in export captive farms set up as an increasing number of people are looking for chemical-free food from Eco-farms.

Conclusion :

It is heartening to note that more and more farmers in our midst have started practising organic farming. The author's venture with five organic farms set up in Malnad region in Karnataka with different spices, particularly cardamom and pepper, yielded promising results in producing acceptable organic products. European countries have established own inspecting and certifying agencies for their requirement of organic products. One such is 'SKAL' - that offers 'EKO' - a quality symbol for genuine organic products. A leading Dutch Company 'Euro Herbs' is planning to import many organic products from India. A private limited company based at Mangalore is assisting them in the supplies, who in turn are in the process of establishing a network with organic farms to maintain flow of quality products. Farmers who register themselves as member growers will enjoy a privilege in exporting their products with premium prices.

An organic farmer can as well be a part of international network. Eco-friendly entrepreneurs are making a business of organic foods for meeting the world demand for healthy growth.

Ref : Official journal of the European communities.

- SPICE INDIA

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MANAGEMENT

LAND AND WATER MANAGEMENT ON SLOPING TERRAIN

H.S. PANNU*

Outside the Government controlled forest lands, the Plantation Industry in India has inherited the largest section of land in the private sector, and therefore has the greatest responsibility in protecting the environment.

Taking a line from Clemenceau's famous phrase ". . . war is too serious a matter to be left to professional soldiers...". Land and water management in India is too big a job in size and scope, and much too important in its implications to be left to Government regulations only. However across the nation there is a serious misconception, that what is required is more forests in the traditional sense of the word. What is infact required is that we should make the best possible use of large areas of denuded and derelict lands in a manner which will fit in with the needs of an impoverished and fast increasing population. It is in this direction the plantation industry, with its expertise and management structure should lead the way. Regretably this is not so, and in the recent times private sector organisations with various backgrounds have taken the lead to afforest the countryside. This failure not being enough, large tracts of land under the control of the plantations show extensive damage caused by poor or inadequate land and water management.

Land degradation (consequently the mismanagement of water resources) is an insidious process, its negative impact on productivity goes largely unnoticed, even though it is of enormous proportion. Land invariably is the silent sufferer when the market forces reduce the returns to the industry.

Top soil, the most fertile portion of the soil has been virtually lost and if nature is left to restore one inch of this soil it will take many many years. Therefore it is essential that we now assist nature to restore this furtile cover before the damage is irreparable. The cost of this human assistance is insignificant when compared to the cost of inputs and the declining productivity the industry will have to bear in the future.

The reduced water holding capacity of the soil has resulted in non-quantifiable losses of sweet water through floods on account of excessive run off of rain water. Such losses are responsible, to a large extent, for the drying up of springs and wells and for very low river water discharges in the dry months. The prevention of such losses is absolutely necessary for adequate replenishment of ground water which sustains the vegetation during the dry months.

It would be incorrect to assume that we do not posses adequate knowledge to preserve our natural resources of land and water and manage them to the best advantage of long term higher productivity, capable of sustaining the ever growing population. Despite this allround awareness we see either total neglect or, some well meaning land and water management systems become ineffective owing to lapses. There are some near perfect models seen; but their size is totally inadequate for the problem faced. Without a determined effort to improve land and water management the fast deteriorating situation will not be reserved.

TYPES OF DAMAGES COMMONLY SEEN	CAUSES
(1) Annual scraping of all grass and weeds	Use of mammoties for weeding.
(2) Total absence of soil and water management methods when sloping land cultivation is started.	Incorrect planning of operations.
(3) Neglect or damage to contour graded lock and spill drains.	Absence of grass filter strips results in the silting of drains and irregular or no desilting results in choking of the drains.
(a) Totally ineffective, completely silted, do not have grass filter strips above the upper lip of the drain.	

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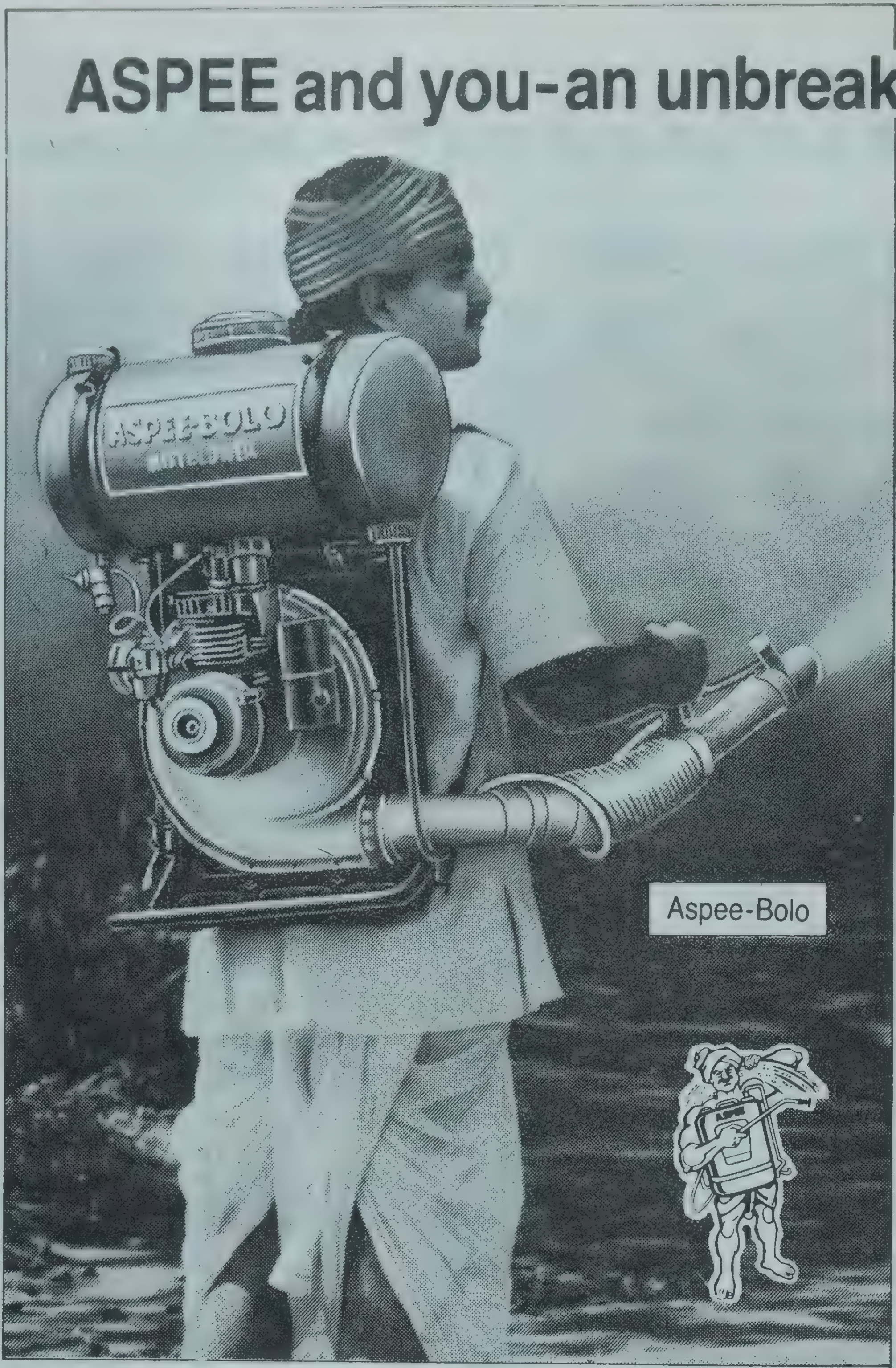

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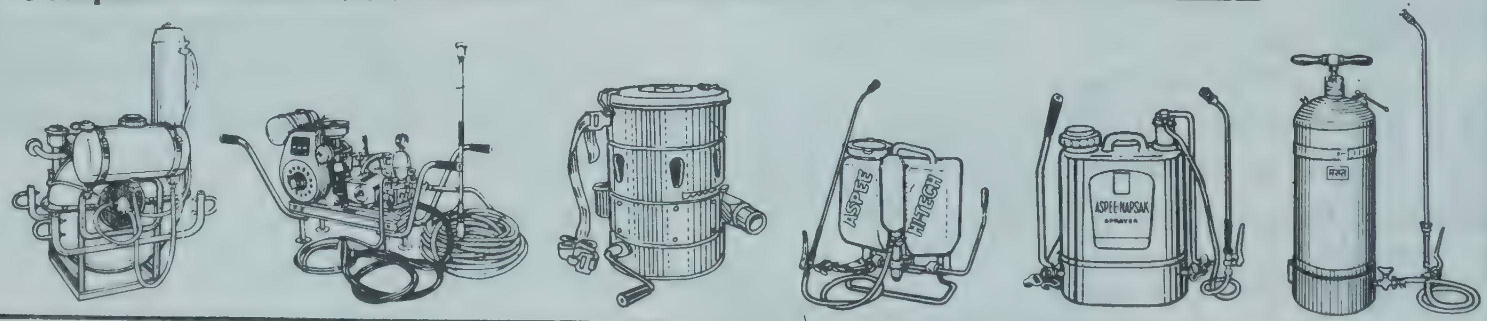

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TYPES OF DAMAGES COMMONLY SEEN	CAUSES
(b) Partially silted with only a few drains having grass filter strips.	
(2) Contour stone terraces and Walls.	Poor awareness, hence stones removed for other purposes.
(a) Damaged due to neglect, terraces become ineffective.	Sheet erosion caused owing to absence of grass filter strips.
(b) Similar damages seen on field and road banks.	
(3) Reversed slope down drains, leader drains and ravines check dams.	Increased speed of water. Lack of maintenance of the sides and the bed of the drain. Absence of grass filter strips. Absence of check dams or the dams are silted.
(a) Stone paved drains sides damaged or bed eroded.	
(d) No grass filter stips.	
(c) Ravines check dams ineffective or gullied.	
(4) Roads and field banks.	Absence of soil holding vegetation on the earth banks and no grass on the lips. Damaged stone terraces not repaired.
(a) Upper edge of the road and field banks damaged due to surface flow of water from the field above.	
(b) Damaged stone banks ineffective to stop soil erosion.	
(5) Roads, sides of roads and drains.	Absence of grass side borders on both sides of the road. Lack of roads and drains maintenance. Absence of soil holding vegetation on the field and road banks. Inadequate or non-existent grass filter strips.
(a) Sides of roads eroded and damaged.	
(b) Blocked inlets to direct water from flowing on the road surface or these are totally absent.	
(c) Roads and edges gullied by uncontrolled flow of water on the road.	Drains and culverts blocked or inadequate. Absence of silt pits along the drains, and incorrectly sloped drains.
(d) Drains silted with soil from the field above, the road or a slumped bank.	
(6) Rubber planting contours.	By increased water flow down the stem of the tree as the canopy closes. Increase in droplet size of the post rain drip from the trees resulting in greater soil disturbance.
(a) Within 15 years the planting terraces are ineffective.	
(7) Formation of Gullies. Indicating large scale erosion.	Lack of a soil conservation policy.
(8) Fields with vacancies or empty patches close to sheet rock. These empty patches of land are exposed to the direct impact of rain and sunshine, they are heavily eroded areas.	Lack of soil holding vegetation.
(9) Heavily eroded stream banks and edges slumped causing frequent changes in the water course.	Absence of bamboo growth along the banks, this area is converted into grazing land.
(10) New clearing/Replanting.	Untimely operations, absence of proper soil conservation systems in place prior to the onset of the rains.
(a) Large areas of land left exposed to the hot sun during the dry weather, and extensive disturbance of soil during pitting.	Inadequate material to thatch, or incorrect timing. Inadequate cover crop.
(b) Exposed land without thatching with mulch or cover crop.	

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The damages listed above are only a fraction which are commonly seen, these lead to serious erosion, contributing to silting of drains, dams and reserviors, mainly through unprotected rains and ineffective check dams.

If we are serious about securing the future for our plantation crops, the mistakes we have made in the past in managing our natural resources must be corrected with the utmost energy and determination. This will be possible, only if the threat which poor management of our natural resources poses to the country, is viewed realistically and not under-plays or pushed under the carpet.

We must not adopt self-delusive approaches to natural resource management; because these problems have already assumed critical dimensions. An alarmist rather than a complacent view of the emerging scenario is infact unavoidable if we take note of the fact that while, on one hand, our basic life-support systems have already been depleted and damaged and are unable to cope with their existing burdan, on the other, the pressure to which they are being subjected continues to mount relentlessly. To maintain sustainable tea yields, high cost operations such as sprinkler irrigation have become essential over a large area under this crop. This is true for cardamom and coffee too. Rubber plantations are unable to reduce the immature period despite advanced planting material. The imbalance of nutrient availability is resulting in higher disease incidence.

Nature has paid dearly and there is no option but to take a conscious and deliberate decision to redress the balance in favour of land management in the widest sense of the term. This will lead to better water resource management by preventing excessive run-off losses which are taking place to-day. It will also result in the increased replenishment of our invaluable ground water resources.

The battle for survival will be long and hard and will ultimately be won only by appropriate physical action at field by field level. Starting micro-watershed rehabilitation programmes, comprising of terraces, bunds, drains, trenches, check dams and storage dams.

The maintenance of soil condition and the control of soil erosion should be the base guiding principle for all land use operations, the management of plantations being no exception to this. Various ways of protecting land from soil loss and soil degradation have already been devised, researched and recommended by research and Government organisations. It is this local knowledge which should be studied, judged for its practicality and put to use, before importing costly inputs to sustain the productivity. We should direct our efforts to maximise benefits by reducing erosion, improving conditions and managing our water resources.

To reduce erosion, two aspects need consideration :

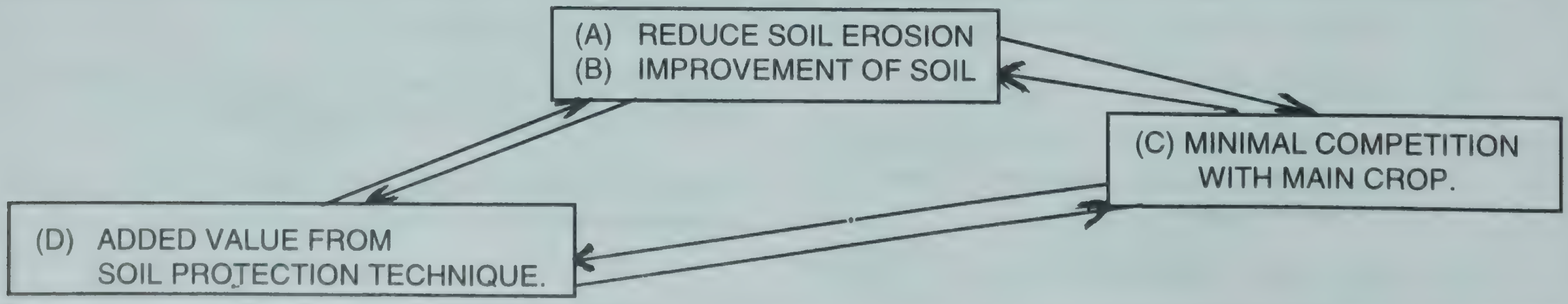
(1) Stabilising slopes.
(2) Reducing surface water run-off.

This can be achieved by using man made structures and vegetation in the appropriate place and manner.

Man made control structures i.e. contour drains, terraces, bunds and down drains, need strip filters of plant cover to increase their efficiency. Therefore, choice of plant to be used for this purpose is very important, as soil protection techniques should not have adverse impact on the surrounding main crop. As the plantation crops are deep rooted (exception cardamom), they stabilise the slopes; but a belt of grasses or other herbaceous cover underneath is the best option to catch the soil sediments and slow down the speed of the water.

To assist nature to restore our derelict soils the role of leguminous plants is very important. Whatever plant is grown to control soil erosion or to enrich the soil, there is also the risk of adverse impact on the adjacent main crop by above-ground competition for light or below-ground root competition for water and nutrients.

Therefore we must at no time lose sight of the balance between the following three main objectives :


(A) REDUCE SOIL EROSION
(B) IMPROVEMENT OF SOIL
(C) MINIMAL COMPETITION WITH MAIN CROP.
(D) ADDED VALUE FROM SOIL PROTECTION TECHNIQUE.

FINANCING NON-CONVENTIONAL ENERGY SOURCES IN PLANTATIONS

R.N. HEGDE *

Courtesy : ANERT, Thiruvananthapuram.

Solar driers for black pepper installed by an exporting firm in Kerala State.

Financial Institutions have been promoting development of plantation crops since many years for both new planting and replanting and related infrastructure facilities in crops like tea, coffee, arecanut, cashew. Loans are also provided for factory buildings, machineries, electrification, gensets, labour lines. In plantation sector, processing is an integral part of production activity without which the produce cannot be marketed.

Among the plantation crops though a few like coffee, black pepper, coconut and arecanut may be sun-dried and marketed as such, a majority of these plantation crops require elaborate processing before they are sold. For instance, Rubber-smoking or hot air drying, Tea-withering in troughs and drying, Cardamom — hot air drying (curing), Oil palm — sterilisation with steam and boiling, Cashew — roasting, oil bathing and drying with hot air by burning furnace below, Cocoa — electric ovens or conventional samoan type driers. All the above activities are covered under term finance from the banking industry.

The energy requirement for processing in plantation industry is very large. For instance, it is reported that the requirement of energy for 1 Kg. made tea is 1.7 times higher than what is required for manufacturing 1 Kg. steel.

At present, this huge requirement of energy in processing of plantation crops are met by coal, electric power, fuel-wood or diesel gen-sets which put much strain not only on our economy but also ecology, especially in the light of energy crisis faced in India and the world as a whole.

Energy problems led planters in India to look into different aspects of conservation, management of energy and also search for alternative sources of energy. With limited potentials on non-renewable sources of energy, viz., petroleum products and coal in our country, bio-mass, wind and sun are the only main sources of non-conventional energy for this sector in which banks can find new avenues for financing. The investments are environment friendly and pollution-free.

In the light of developmental role being played by banks in the country for the cause of environmental protection and towards a green world which is also an integral part of sustainable agriculture, financing alternative energy sources, assumes great significance which contributes for conserving eco-system. Fast depleting forest cover and non-renewable energy sources is a matter of concern for everyone of us, since the day is not far off when we have sufficient production of plantation yield in raw form but we may not have energy to process the same to make it suitable for consumption. Hence, it is the duty of the financial institutions to promote and

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* **Manager (Tech), NABARD R.O., Thiruvananthapuram.**

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finance one or the other investments described below which either reduces our import bill for petroleum products or protects the existing green cover in the country.

BIO-ENERGY PLANTATIONS

A number of planters and corporate bodies who own wasteland areas adjoining their existing plantations may utilise for raising fuelwood plantations to meet their individual requirements. The trees selected should be harvestable in a comparatively shorter time. The Government lands given to individuals under lease or under tree patta or any other schemes may also be used for raising these plantations which can also be called as short spacing and short rotation forestry.

Selection of species — The species raised as energy plantations should be fast growing even under arid condition, coppicing, yielding wood having high calorific value and multiple use. Among the renewable sources of energy, it is only the bio-mass which can give all solid, liquid and gaseous types of fuel.

Following tree species may be considered : Acasia Auriculiformis, Albizia lebbek (siris), Cassia siamea, Casuarina equisetifolia (Australian pine), Dalbergia melanoxylon, Prosopis juliflora (mesquite bean), Leucaena leucocephala (subabul), Populus euphratica (poplar), Eucalyptus sp. & Alnus sp. `Alnus', sp.

The items eligible for financial assistance are, right from nursery raising, land preparation, low cost fencing to all initial expenditure to plant during first year to till the trees come up to yielding stage. National Wasteland Development Board, Govt. of India had introduced a promotional scheme known as Margin Money Assistance scheme wherein grants upto 25 per cent of the total project cost will be provided to deserving projects on the merit of individual cases subject to the sanction of the project by the banks. The repayment period may vary from species to species depending on the gestation period, yield and income. Such loans are to be repaid within a maximum period of 15 years.

WIND ENERGY PROJECTS

Wind energy can be used to run wind mills which in turn can operate pumps. If the wind speed is high as on the sea coast, then electricity can also be generated from wind mills. It is reported that the technology inputs for design, development, testing, certification, etc., of indigeneous medium and large wind electric generators are provided mainly by Wind Energy Centre set up at National Aeronautical Laboratory, Bangalore. Since the investment is capital intensive and high-tech oriented, the banks might not yet have financed so far on a large scale. But individual planters may be encouraged to formulate projects to their specific requirements and if it is technically feasible and financially viable assuming savings in the cost of energy presently used, as income for the investments.

SOLAR ENERGY EQUIPMENTS

Our country is fortunate that we are bestowed with plenty of sunshine almost throughout the year. So far, we are using sunlight as energy on a limited scale for drying food products. The technology is now available to use solar energy which could save conventional source. It is reported that National Centre for Solar Energy Research and Development at Gwalpahari, Gurgaon District, Haryana under the Dept. of Non-Conventional Energy Sources, Govt. of India provides R & D support for this investment in our country.

The project may be capital intensive and in many cases it may not be economical, looking to the heavy initial investment. However, if individual corporate bodies find that adoption of this technology is a savings to them over a period, such projects could be financed by banks. Solar thermal pumps, solar driers, solar domestic and industrial water heaters, solar timber kilns, etc., could also be financed.

In the case of both solar and wind equipments banks do not have cost-benefit model since it is still considered under innovative projects, however on individual merit basis it may be financed. These non-conventional energy sources may serve as

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complimentary to the existing energy sources in the plantations.

With a view to improve the burning efficiency of wood and agro-wastes required as cooking fuel or industrial energy, new types of smokeless stoves (chullas) could also be financed when plantation development credit projects are considered with labour lines. This will save huge quantity of wood presently utilised for cooking fuel in plantation labour colonies.

All the above investments are yet to become popular with planters, as these are generally difficult to adopt on the farms. Better co-ordination among all the developmental agencies for the technical support is required to popularise the same. Lot of efforts for motivation, education, extension, publicity and market support is necessary to transfer the technology to the field and make them acceptable to the planters. Measuring the benefit in terms of money may be difficult also as the benefits are indirect and felt only after a long period of time.

Number of apex development banks in the country, say, NABARD, IDBI, SIDBI & IFCI also provide refinance facility to commercial and co-operative banks to encourage the growth of lending to this energy saving sector.

It is reported that the scientists of the Planters Energy Network, School of Energy Sciences, Madurai Kamaraj University undertake Energy Auditing & studies on minimum energy required for various processes of the plantation industry and the planters also may seek their guidance.

In the interest of conservation of bio-diversity and for the survival of mankind, popularising the environment friendly investments is the need of the hour.

Wherever plenty of sunlight and wind are available, the planters/corporate bodies may think of establishing these energy harnessing equipments with bank finance and availing the grants available from the department of Non-Conventional Energy Sources, Government of India.

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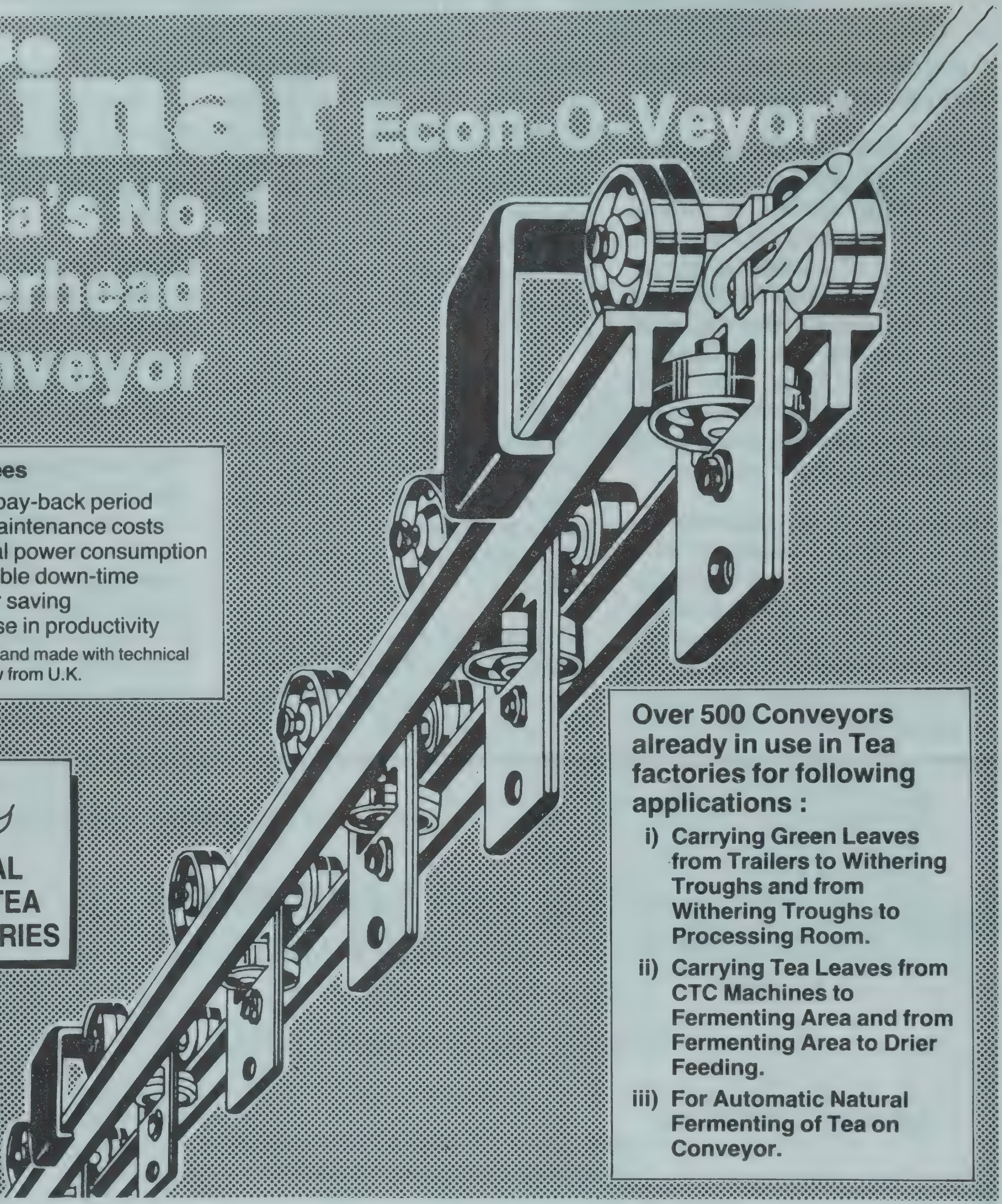

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STRATEGIES FOR THE MANAGEMENT OF SHOT-HOLE BORER

N. MURALEEDHARAN
UPASI Tea Research Institute

During the last few years several research and advisory articles on the biology, ecology and control of the shot-hole borer (SHB) of tea have been published. The present note is intended to summarise the suggestions and recommendations on shot-hole borer (SHB) management.

1. **Pruning height :** Medium prune (60-70 cm or 24-28 inches) is best suited for borer infested fields (except when other factors demand a different height of pruning).

2. **Post-prune spray :** Immediately after pruning, the field must be sprayed with any one of the following insecticides to prevent the migration of beetles to adjacent fields.

   a) Fenvalerate 20 EC (Sumicidin, Agrofen or Fenval) @ 500 ml/ha.

   b) Deltamethrin 2.8 EC (Decis) @ 500 ml/ha.

   c) Quinalphos 25 EC (Ekalux or Suquin) @ 750 ml + Dichlorvos 76 EC (Nuvan or Vapona) @ 250 ml/ha.

   d) Cypermethrin 25 EC (Cymbush) @ 250 ml/ha.

   e) Cypermethrin 10 EC @ 625 ml/ha.

   Use a spray volume of 675 l/ha, if hand operated knapsack sprayers are used. The volume of spray fluid may be reduced to 400 l/ha, if power sprayers are utilised. Care must be taken to drench the frames and prunings. Do not allow the removal of unsprayed prunings.

3. **Manuring of pruned (infested) field :** Apply high level of potassium fertiliser in the pruned year. It is suggested to use N and K_2O in 1 : 2 ratio. This will help in the growth of healthy frames and prevent the build up of borer population. Potassium is known to impart physiological resistance to plants against many pests. In the subsequent years of the pruning cycle, apply fertilisers at normal rate.

4. **Infestation trend in the pruning cycle :** In the pruned year as well as in the second year, bushes will be comparatively free from borer infestation. An exponential increase in infestation is seen by the end of the second year after pruning.

5. **Assessment of infestation in the second year :** Assess the level of borer attack in the 24th month after pruning. For this, divide the field into two ha blocks. From each block, collect at random 200 stem cuttings, each of 20 cm long and 1 to 1.5 cm diameter. Any bias towards the collection of infested branches will lead to a wrong conclusion. Calculate the percentage of infestation in each block and the average percentage of attack for the whole field. If the mean percentage of infestation is below 15, repeat the assessment in the 30th month.

6. **Midcycle chemical control :** Start midcycle chemical application if SHB infestation is at or above 15 per cent. Blockwise spraying can be resorted to, if a particular block has high percentage of attack, though the field as a whole may have very low incidence of infestation.

6.1 **Insecticides to be used for midcycle application :**

a) Fenvalerate 20 EC — 500 ml/ha.

b) Deltamethrin 2.8 EC — 500 ml/ha.

c) Cypermethrin 25 EC — 250 ml/ha.

d) Cypermethrin 10 EC — 625 ml/ha.

e) Quinalphos 25 EC — 750 ml + Dichlorvos 76 EC — 250 ml/ha.

6.2 **Volume of spray fluid :**

Use 300 to 350 litres of water per ha with motorised sprayers.

Use 400 to 450 litres of water per ha with hand operated knapsack sprayers.

Direct the spray towards the branches.

6.3 **Schedule for spraying :**

Start midcycle chemical control from the end of second year or early third year and continue till the field is pruned. Insecticides are to be applied in April, May, October and December.

7. **Protection of new clearings :**

Young plants, planted near borer infested fields are more vulnerable to the attack of the pest. For the protection of plants in the new clearings, insecticides should be sprayed on to the branches in April, May, October and December, till they are subjected to formative pruning. The dilution rates of the recommended insecticides are given below :

Fenvalerate 20 EC :
1 : 1000 (10 ml in 10 l water)

Deltamethrin 2.8 EC :
1 : 1000 (10 ml in 10 l water)
Cypermethrin 25 EC :
1 : 2000 (5 ml in 20 l water)

Cypermethrin 10 EC :
1 : 800 (12.5 ml in 10 l water)

Quinalphos 25 EC
(3 parts) +
Dichlorvos 76 EC
(1 part) :
1 : 1000 (10 ml in 10 l water)

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CABLE TV AND PLANTATION WORKERS

According to a survey conducted at Guderale Estate by A.A. Shijad, Dr. V. Sivakumar, Vishal Raina & T.T. Kuruvilla, there are a number of welcome features to prove that the novel idea of providing cable TV connections has several positive effects on plantation workers who live in isolated rural communes. A report :

A scheme to provide Cable TV Network through direct Satellite Reception to Factory Division of Guderale Estate was implemented under the aegis of the Staff Club. Cable TV connections were provided to all employees — Staff, non-staff and workers who joined the scheme. This was a voluntary scheme with members providing the Capital required with a one time donation and a monthly subscription towards running expenses. The Management provided assistance by giving recoverable advances and deducting monthly contributions from the Salary of employees. The cable TV connections were given in December 1993 with 3 Star TV channels in English — BBC, Star Plus and Prime Sports — Sun TV (Tamil) Asia Net (Malayalam) Channels.

There are 240 workers' families resident in the Factory Division. Of these 103 workers have joined the Scheme. One remarkable feature was that although only a few workers had TV sets at the commencement of the Scheme a substantial number who had no TV's paid the capital contribution and joined the Scheme with a view to acquire a TV set at some date in the future. This is indicative of the popularity and the need for such a facility among the workers.

ALCOHOLISM

Alcoholism had been traditionally a major problem on this division. One of the objects of the survey was to find out the effects of providing an alternative source of entertainment on the incidence of alcoholism.

Among men the opinion was that alcoholism has come down between 50 per cent to 75 per cent. Among females the vast majority (71 per cent) felt that alcoholism has come down by 75 per cent after the introduction of Cable TV. Overall the majority felt that there has been a substantial reduction in alcoholism, no one has stated that there is no change or alcoholism has increased after the introduction of Cable TV.

There are two clandestine arrack dispensing points at Factory Division and informal enquiries reveal that there has been substantial reduction in sales which corroborates the findings of the survey.

PETTY QUARRELS

Incidence of petty quarrels in the workers colonies which has a close nexus with alcoholism has considerably decreased. The results show a similar pattern to the survey on alcoholism with men stating that quarrels have come down by 50 per cent to 75 per cent and the vast majority of women (63 per cent) that quarrels have come down dramatically (over 75 per cent).

TRIPS TO MUNNAR

The workers spend a considerable amount of time and money in going to Munnar town particularly over the weekend holiday. One reason for this was for entertainment — for seeing cinema.

The survey showed a similar trend for both males and females. The majority felt that the introduction of Cable TV has only slightly decreased the number of times the workers went to Munnar town. Obviously the trips to Munnar has a composite purpose. The workers used the occasion for their weekly shopping which has still to be done. Therefore Cable TV has had only a slight effect in this respect.

One of the purposes of the survey was to ascertain the adverse effects, if any the Cable TV has had on workers causing absenteeism and the effect on children's studies.

The vast majority of the workers felt that there was no change in the pattern of absenteeism from

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the past. Although cable programmes are available for 24 hours, viewing is restricted to the evening hours and only when the most popular programmes are telecast.

The results of the survey on the effect of Cable TV on children's education which is of serious concern in urban centres showed that men were equal in support of two extreme positions. 35 per cent felt that Cable TV has very adversely affected children's education while 33 per cent felt that it has no effect. The vast majority of the women who really oversee children's education / home work felt that children's education was only slightly affected. Overall, the majority of workers felt that children's education was only slightly affected. Considering the fact that the poll covered the period of annual promotion examination in March/April, the results revealed that time could be found for children to study.

CONCLUSION

The most significant finding of this study was that sharp reduction in the incidence of alcoholism among workers after the introduction of Cable TV. The reduction is dramatic and is highly significant. It would be seen that workers were taking to alcohol because of boredom and there was nothing to occupy them after work in the evening. The only recreational amenity provided under the PL Act is the Labour Club. These Clubs are used mainly for playing cards and are visited exclusively by men. Women have no source of entertainment. To remedy this problem Recreation Centres were built and provided with TV/VCP units so that women also have some entertainment. But this did not work well because women were busy in the evenings with household chores to visit the Recreation Centres. To be effective, entertainment had to be provided close to the house. This need has been met by Cable TV.

Consequent to the reduction in alcoholism is the reduction in quarrels. Whereas in the past it was common to find an unruly, inebriated group of men on the main road in the vicinity of the canteen in Factory Division, now in the evenings the canteen and the road is virtually deserted. The men are in their houses watching TV.

The survey showed that Cable TV has not had any adverse effect on the rate of absenteeism nor has it significantly affected children's education. There are many positive effects of Cable TV on plantation population who live in isolated rural communes.

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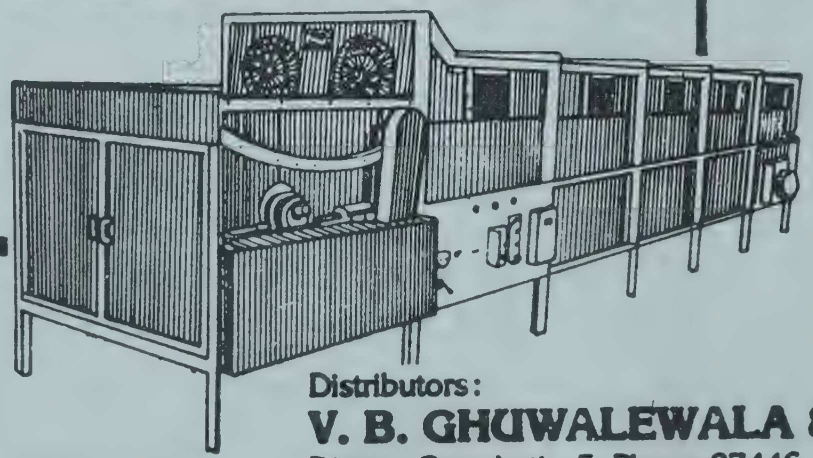

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PROCESSING AND PRESERVATION OF SPICES

K. SUKUMARAN ACHARY*

Spices comprise fragrant products of plant origin used for flavouring food and beverages. India, the land of spices, grown about 63 spices and many of them occupy sizeable area under cultivation. The important spices grown in India are pepper, cardamom, ginger, turmeric, chillies, coriander, cumin, celery, fennel, fenugreek, cloves, nutmeg, cinnamon. Spices are extensively used in India for culinery purposes. They are also important ingredients in the preparation of curry powders. Essential oils and oleoresins are also extracted from the spices, which are extensively used in pharmaceutical and chemical industries. There is a good export demand for Indian Spices, because of their superior quality. Our total export of spices in 1992-93 was 1,25,557 tonnes valued at Rs. 386.78 crores.

Processing and preservation of spices is most important as it determines the quality of the end products. By adopting several scientific methods of processing and preservation, the end products will be of superior quality and it can be stored for a longer period without affecting the quality of the product. The method of processing and preservation of different spices are given below.

BLACK PEPPER :

Black Pepper, the king of spices, is the most important spice crops in India. It is valued for its characteristic penetrating aroma and hot pungent and biting taste. The annual production of pepper in India is about 60,000 tonnes.

After harvesting, the berries are seperated from the spike by rubbing them between palms or trampling under the feet. The green pepper is then dipped in hot water for one minute and dried in sunlight for uniform colour and speedy drying generally it takes five-seven days to dry to a moisture level of 10-11 per cent. The dried pepper is cleaned to remove stems, husks and pinheads. An yield of about 33 kgs of black pepper is obtained from 100 kilogram of green pepper. Black pepper collected from different growing regions is pooled, given a further cleaning and graded according to size before export. The bulk of export and consumption of pepper is in the form of black pepper. It is used as the raw material for oleoresin and oil industry.

1. WHITE PEPPER :

White pepper is the product obtained from berries that are fully ripe. They are picked and piled in heaps to ferment or are soaked in water for five-seven days, the pulp and outer coating of the seed are then removed. White pepper is with yellowish grey in colour and smooth surface. It is also prepared from black pepper by grinding off the outer parts by machinery. It fetches higher price than black pepper and used in soups and sauces.

BUFF COLOURED PEPPER :

Freshly harvested over-mature berries are subjected to heat treatment to prevent the blackening of the skin and dried to get a bleached finish. It gives a lighter coloured powder on grinding. The colour is as white as that of white pepper and the percentage of dry matter yield is high (28-30 per cent) compared to white pepper as there is no loss of outer skin.

Green Pepper Products :

(i) CANNED TENDER GREEN PEPPER : Tender green pepper berries is canned in two per cent brine (Common Salt) solution and it is sterilised.

(ii) BOTTLED TENDER GREEN PEPPER : A higher salt solution is used (15-20 per cent) and the heat processing is avoided in bottled green pepper. Preservatives like organic acids are used. It will remain sterile for longer periods than those in cans.

(iii) PICKLED PEPPER : Different types of green pepper pickles in brine (12-16 per cent) Vinegar, Oil and in conjunction with other material like tender mangoes, green ginger, green chillies, mixed vegatables etc. are also prepared.

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* **Marketing Officer, Directorate of Marketing and Inspection, Bodinayakanur - 626 513.**

(iv) DEHYDRATED GREEN PEPPER : Slightly under mature pepper is subjected to appropriate heat treatments to arrest the blackening of the skin and dehydrated under controlled condition. The rapid drying is carried out in hot air drier at medium temperature. This product has a fresh spicy flavour.

PEPPER POWDER : Pepper powder is obtained by grinding black pepper whole to such a fineness that the whole of it passses through a 500 micron seive. It shall be free from admixture, mould growth, insect infestation or musty odour.

PEPPER OIL : Pepper contains an average one-four per cent of volatile oil which is responsible for the characteristic aroma. It is obtained by steam distillation of coarsely ground spice for six-eight hours.

PEPPER OLEORESIN : Pepper contains 5.5 to 17 per cent oleoresin. Kottanadan variety gives 17 per cent oleoresin. Both aroma and pungeny can be obtained in the oleoresin. It is extracted by solvent extraction process. It has the largest world market. The larges user is USA.

PEPPER SAL : Pepper + Salt - known. by the trade name developed by CFTRI which can be used in salads, drinks, meat etc.

EXPORT : Pepper is the most important spice exported from India. It accounts about 36 per cent of the total export earnings from spices. USA, Canada, Japan, Germany, Italy, CIS, Czechoslovakia, Poland are the main importing countries of pepper from India. The important quality factors are extraneous matter, light berries, moisture percentage. Malabar garbled/ ungarbled, Tellicherry garbled, light pepper, Pinheads, etc. are the major Agmark grades. MG-1 accounts for 80 per cent of the total pepper exports.

2. CARDAMOM : Cardamom is popularly known as "Queen" of Spices. It is grown in the high ranges of the western ghates in South India.

In processing of Cardamom, harvesting is an important factor as it determines the quality of the produce. Importance should be given to the stage of maturity of seeds rather than the time or seasons. It should be done when the seeds becomes black in colour, while the skin of the capsules remain green. In the fully riped staged, the capsules split open at drying and do not develop the desired green colour similarly immature capsules while drying will shrink giving a shrivelled appearance. So to get good quality produce, pluck the capsules just before attaining full ripense. It is dried in sum or in specially built drying houses by radiation of heat. For maintaining quality, temperature and moisture will have to be controlled during drying and it is best done under artificial curing. It takes 28-36 hours. Average it gives 20 per cent recovery.

The dried capsules are rubbed with hands or with rough coirmat and winnowed to remove the ends and foreign matter. After cleaning, the dried cardamom is stored in black polethene lined gunny bags to retain the green colour during storage and it should be kept in wooden boxes.

Deterioration in quality of cardamom is caused by biological and chemical reactions. Biological involves growth of moulds-encouraged by excess moisture. Chemical reactions are accelerated by the presence of light and the black polethene lining prevents the entry of light. Temperature variations also can accelerate the chemical reactions and the wooden boxes, because of their poor conductivity, function as a heat insulator to reduce temperature variations. The aromatice constituent in cardamom is highly volatile and these oils get evaporated continuously from capsules. The air movements accelerate the process. Thus on storage, cardamom looses its aroma. The loss can be minimised if cardamom is stored under airtight conditions.

BLEACHED CARDAMOM :

Bleaching is done in the case of varieties which do not retain their colour during drying and storage. Drying operation is simple here as it is sundried. The process consists of pretreating the freshly harvested capsules by soaking them in 1 per cent solution of bleaching powder for 30-60 minutes followed by dipping the lot in dil HCL solution (0.2 per cent) for 23 minutes. The bleached capsules are washed and sun dried to 8 to 10 per cent moisture content. Another method is by exposing the capsules to SO_2 fumes. The advantages of bleaching is that even after prolonged storage, the consumer acceptance is not affected because of white colour. Disadvantages : 1. High sulphurdioxide content in the capsules. 2. Reduction in oil content and adverse effect on aroma and flavour.

BY PRODUCTS : Cardamom contains three-five percent of an aromatice volatile oil, very much valued in food flavouring and low grades of cardamom is used for oil extraction.

Safe shelf life for oil-six months.

Cardamom powder-four months.

EXPORT : Cardamom for export is graded into 34 grades of which about six grades of Allepply green type and three grades of coorg green are normally exported. Cardamom is exported from India to Saudi Arabia, Kuwait, CIS, Japan, Qatar, Bahrain, Germany, Dubai etc. The major export is to gulf countries. For export it is packed in 1 kg consumer bags (300 gauge HDPE) and five such bags are packed in one gunny bag lined with black polethene and eight such gunny bags are packed in a master gunny bag and the corners of the master gunny bag are stitched in such a way that it forms a rectangular shape. It is also packed in cartons of different sizes and also in wooden boxes.

GINGER

Ginger is an important spice, known in India from ancient times, used both as spice and medicine. India accounts for about 50 per cent of the world's ginger production and exports about 10-15 per cent of the produce.

CURING : For preparation of dry ginger, harvesting is carried out after eight-nine months. The Shizomes are cleaned of soil, root and stems by washing. The outer skin is peeled off using split bamboo knife. Care is taken to remove only the thin outer skin without damaging the essential oil cell, so as to avoid any loss of oil during drying. Peeling can also be done by putting the rhizomes in rotating wire mesh drums (manually or electrically operated) after peeling it is again washed in water and is dried in the sun for seven to ten days to a moisture level of 10-12 per cent. After drying, the rhizomes are rubbed together to remove the skin particles and any foreign matter adhering to them and then packed in gunny bags. In improved system, ginger can be mechanically dried. For this purpose, peeled ginger placed in a drying chamber and with the help of electric heating coil and blower, the rhizomes are dried at a temperature of 80°C. Some times the rhizomes are sliced and dried using mechanical dries, inorder to achieve quicker drying. This product is suitable for preparation of ginger powder or oleoresin. The yield of dry ginger is 16-25 per cent of the green ginger depending upon the variety.

BLEACHED GINGER : Bleaching is usually done to coverup the sub-standard quality of ginger. So it always fetches Rs. 50 to 100/- less than the unbleached type. Bleached ginger is produced by repeated soaking of the peeled ginger in 10 per cent lime solution. Peeled ginger is immersed in lime solution for half an hour and then dried in shade. On draining the water, it is again immersed in lime and dried in sunlight. For proper bleaching the process is again repeated.

GINGER PRODUCTS :

(1) GINGER POWDER : This is made by grinding dry ginger to mesh size of 50-60. This is used in some of the dry spice mixes, ginger beer, wine and baked goods.

(2) GINGER OIL : Ginger oil is produced by steam distillation of the dried freshly ground ginger. Distillation takes 10-15 hours and the yield of oil ranges from 0.5 to 2.5 per cent. It is used as a flavouring material in various alcoholic and non-alcoholic beverages, confectionery and perfumes. The world production of ginger oil is about 30 tonnes/annum.

(3) GINGER OLEO-RESIN : The spice/flavour value of ginger is due to two factors viz. The volatile oil contributing the aroma and the resinous non-volatile portion responsible for the pungency. Oleoresin is the total extract which contains both volatile oil and pungent extractives. This is prepared by extraction of the powdered dry ginger employing suitable solvent like acetone, alcohol or ethylene chloride. The solvent is then distilled off to obtain the Oleoresin (Yield 4-6 per cent) Reo-de-genio variety is good for Oleoresin extraction. World production is around 150 tonnes/year. It is used in baking and meat products, pickles and chutneys. It is also used in alcoholic beverages and soft drinks.

4. ENCAPSULATED GINGER : The liquid oleoresin is converted into powder form by spray drying. It involves two unit

TEA
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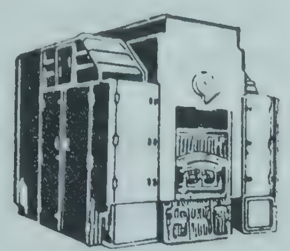

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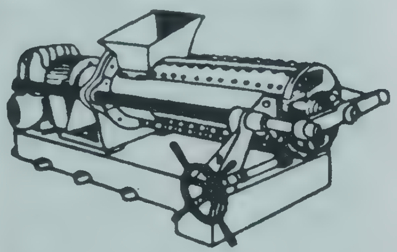

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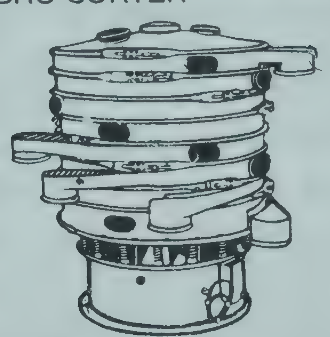

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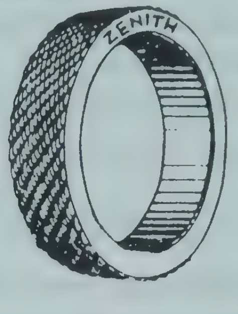

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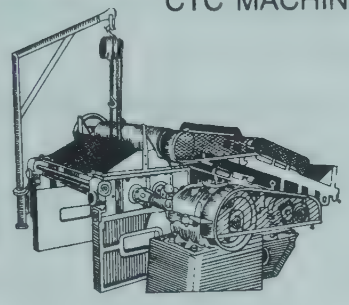

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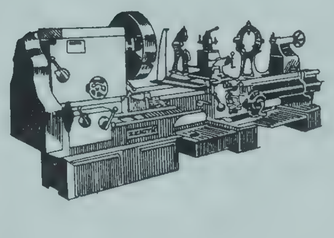

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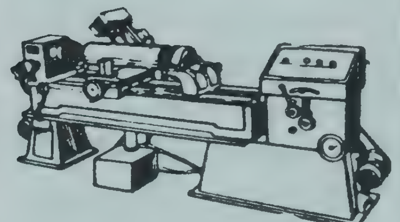

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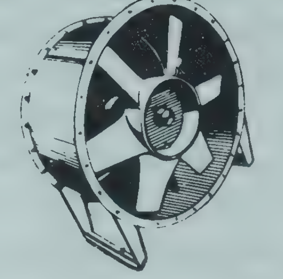

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operations : emulsification of the water insoluble flavouring component followed by dehydration. The advantage of powder flavours are they can be easily incorporated into dry mixes to effect a uniform and homogenous distribution. The flavour strength and quality is fully protected from evaporation and oxidative deterioration.

5. GINGER PRESERVES : The major types of preserved ginger are ginger in brine, preserved in syrup and crystallised ginger (Ginger Candy). The ginger used for above purpose should be less fibrous type, mild in pungency and harvested at a tender stage.

SALTED GINGER : The freshly cut rhizomes are preserved in brine vinegar solution with or without preservative. The ginger in syrup is prepared by immersing the cleared and dried ginger in sugar syrup of increasing concentrations.

STORAGE : The dried rhizomes are loosely stored in pits which are dug upto about 1 M in a cool place protected from the sun. A layer of sand or saw dust is spread at the bottom of the pit and seed rhizomes are filled in it. The pit is left uncovered or covered with a wooden plank, leaving some space between the rhizomes and the plant. The cover is then plastered with a hallow tube inserted for aeration or rhizomes.

It is also stored by making small heaps over sand beds in the corner of rooms. A layer of sand is also put on the top of the heap.

GRADING & EXPORT

According to Indian Standard specifications, whole ginger shall be the rhizomes of Z. officinale in pieces, irregular in shape and size, not less than 15 mm in length or in small cut pieces, pale brown in colour with fibre content characteristic of the variety, with peel not entirely removed and light pieces removed by garbling. The material should not have musty odour or rancid bitter taste and shall be free from insects. It should not contain more than two per cent extraneous matter.

The two types of Indian ginger exported are 'Cochin' and 'Calicut'. The bulk of Indian Export are rough scraped whole rhizomes while some bleached ginger is also exported.

India and China are the major suppliers of ginger in the world market. The major buyers of ginger are USA, Bangladesh, Pakistan, Middle East countries and U.K.

4. TURMERIC

Turmeric, one of the most important spices in India, is mainly used as a condiment. It is also used for the preparation of dyes and for medicinal purposes.

The improved scientific method of curing, turmeric is given below :

The cleaned fingers are taken in a perforated trough of size 0.9 x 0.55 x 0.4m made of G.I or M.S. sheet with extended parallel handle. The perforated trough containing the fingers are then immersed in the pan. The alkaline solution prepared by dissolving 100 grams of Sodium bi-Carbonate in 100 litres of water is poured into the trough so as to immerse the turmeric finger. The whole mass is boiled till the fingers become soft. The cooked fingers are taken out of the pan by litting the trough and draining the solution into the pan. Alkalinity of the boiling water helps in imparting orange yellow tinge to the core of turmeric. The cooking of turmeric has to be done two or three days after harvest.

DRYING : The cooked rhizomes are dried in the sun by spreading in five to seven cm thick layers on bamboo mat or drying floor. During night time, the material should be heaped or covered. It may take ten to fifteen days for the rhizomes to become completely dry. Artificial drying using cross flow hot air at a maximum temperature of 60°C is also found to provide a satisfactory product. The yield of the dry product varied from 20-30 per cent depending upon the variety.

POLISHING : Dried turmeric has a poor appearance and a rough dull outer surface with scales and root bits. The appearance is improved by smoothening and polishing the outer surface by manual or mechanical rubbing.

Manual polishing consists of rubbing the dried turmeric fingers on a hard surface or trampling them under feet wrapped in gunny bags. The improved method is by using hand operated barrel or drum mounted on a central axis, the sides of which are made of expanded metal mesh. When the

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drum filled with turmeric is rotated, polishing is effected by abrasion of the surface against the mesh as well as by mutual rubbing against each other as they roll inside the drum. It is also polished in power-operated drums. The yield varies from 15-25 per cent.

COLOURING : The colour of turmeric always attracts the buyers. Yellow colouring is given externally to the rhizomes while polishing by a dry or wet process. Turmeric powder is added to the polishing drum in the last 10 minutes in dry process. In wet process turmeric powder is suspended in water and mixed by sprinkling inside the polishing basket. For giving a brighter colour, the boiled, dried and half polished fingers are taken in baskets which is shaken continuously. When an emulsion is poured in when the fingers are uniformly coated with the emulsion, they may be dried in the sun. The composition of the emulsion required for coating 100 kilogram, of half boiled turmeric is, Alum 0.04 kilogram, Turmeric powder 2 kilogram, Castorseed oil 0.14 kilogram, Sodium bi sulphate 30 grams, Concentrated Hcl 30 ml.

EXPORT : A major portion of the production of turmeric in India is consumed within the country. There is also demand for good quality turmeric from USA, Germany, UK, Bangladesh, Japan, Singapore and middle east countries.

5. CHILLIES

Chilli is a spice cum vegetable of commercial importance. Annual trade in chilli in the world is 55 to 65 thousand tonnes which is 16.7 per cent of the total spice trade in the world.

The traditional method of making dry chillies by spreading in layers for the initial two or three days in shade and then exposed to direct sun light does not give good quality produce. The time taken for drying is also long. CFTRI, Nagpur have developed an improved method for processing of chillies. It gives superior quality produce. The method is given below.

EQUIPMENTS REQUIRED :

1. One vessel of suitable size to keep the emulsion.
2. One perforated plastic basket for dipping chillies in the emulsion.
3. One plastic basket to drain off the excess emulsion.

PREPARATION OF THE EMULSION : A water based emulsion containing Pottassium carbonate, refined groundnut oil, gum accacia and butylated hydroxy anisole is prepared first. About twentyfive litres of the emulsion is required for treating 100 kilogram fresh chillies. The quantity of chemicals required for this purpose is given below :

Pottassium Carbonate	625 gm
Refined groundnut oil	250 ml
Gum accacia	25 gm
BHA	0.25 gm

Pottassium carbonate and gum accacia are dissolved in water separately. Similarly dissolve BHA in refined groundnut oil to prepare the emulsion, mix the water based solutions and add BHA dissolved groundnut oil slowly while stirring.

DIPPING : Keep the emulsion in a suitable vessel and dip freshly harvested chillies in it for five minutes. Take out the chillies and allow to drain off the excess emulsion. Spread the treated chillies on bamboo mates or clean cemented floor for sun drying. It takes about a week's time to dry.

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SRI LANKA NEWSLETTER

The widespread demand displayed for select best Westerns in the last week of January had declined but a wider range of buyers showed improved interest for the useful selection of light bright teas that came up for sale this week for which some attractive prices were paid. A very encouraging feature that has emerged in the recent past is the strong appearance. The buyers to the CIS have become exceptionally strong and judging on their performance in the recent past, they could very well come out a winner this year. It will take a few more weeks before Westerns acquire quality but at the moment, these plantations are cropping reasonably well. If the current levels could be maintained for both the less useful Westerns and the Uvas which usually have a rough time during this period — we then could say that the tea industry has made a good start and let us hope that the plantations will receive a new lease of life in 1995, according to 'Forbes & Walker'.

EXPORTS

The country broke new ground in the field of tea production. This splendid performance has also been extended to tea exports. Last years total exports of 226 million kg which include 4 million kg of teas imported for re-exports, surpasses the last record figure of 219 million kg achieved in 1988, by 7 million kg. During that period import of tea for export was not permitted and the figure of 219 million represent only locally produced teas. Even if the import component is excluded from the final figure of 226 million kg — the surplus recorded is convincing. About 66 per cent of our total exports have been in bulk form as against 59 per cent in 1993. Sri Lanka tea exports in packet form which constituted 33 per cent of the total exports in 1993 has declined to 27 per cent last year. Although the tea bag exports have improved from 5 million kg in 1993 to 6 million kg last year, the component in relation to total exports is maintained at around 2 per cent. Instant tea exports have increased marginally but green tea shipments have declined.

MAIN BUYERS

Purchases made by Jordan in 1993 were marginally lower to that of the CIS in that year but in 1994 she has emerged as the largest buyer of Sri Lanka tea with a convincing surplus of 5 million kg; relegating the CIS who lead the list last year to sixth position. This single buyer is responsible for an offtake of about 12 per cent of our total exports. Bulk intakes constitute 48 per cent of her total imports. Tea packet imports have declined drastically from 51 per cent in 1993 to 40 per cent last year. Tea bags too have registered a marginal decrease.

Syria after having purchased 5 million kg of extra tea last year has improved her position to become the second largest buyer. Correspondingly the U.A.E. is occupying third position after having purchased 4 million kg of extra tea for last year. The third largest buyer of Sri Lanka tea for 1994 are from the Middle East sector and have between them secured 31.5 per cent of Sri Lanka's total exports. About 32 per cent of our bulk tea exports, 31 per cent of our packet exports and a small weight of tea bags have been consigned to these destinations. ✪

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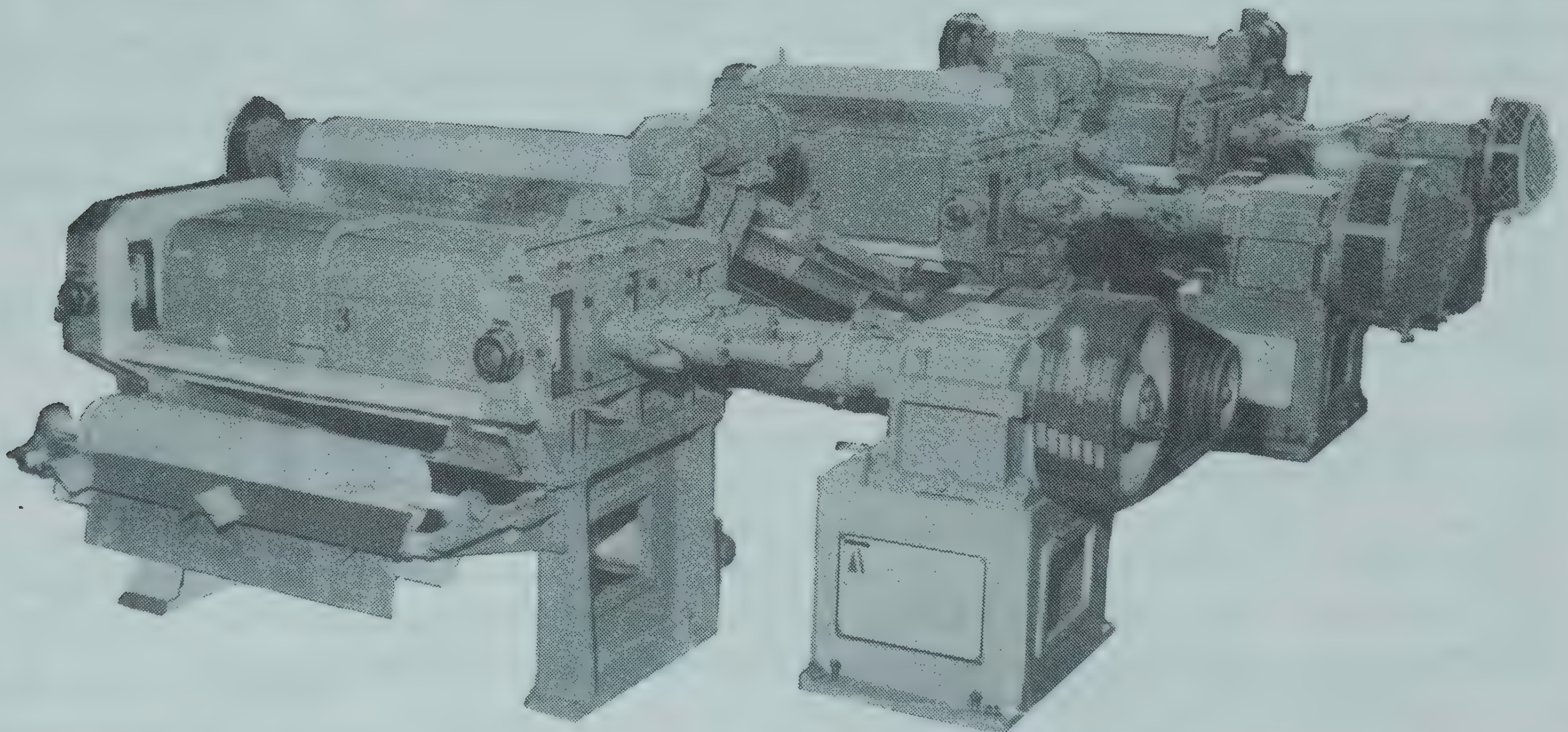

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S. SURYANARAYANAN

NWPA : Encouraging Performance

The performance of the district on the crop front has been very good whereon you will note from the following table that all the three crops have done well over the previous year. The significant improvement in the cardamom crop with increased prices for the same has contributed to significant profitability of the cardamom estates. With regard to the tea market with the CIS withdrawing from the auctions the prices have come down for tea considerably and the markets have now become more quality conscious, and only good teas command some reasonable return. The cost of production has gone up for tea and survival of the tea estates would greatly depend upon the internal demand and export enquiries. As for the coffee crop, with Government allowing for the 50 per cent FSQ, the market this year has gone up making this crop viable after a decade of depressed price levels. Very soon it is expected that all restrictions would be taken away and coffee growers would be free to market their coffee. The Tea Marketing Control order in a free trade situation has no place and our parent association and UPASI have initiated action to get this control provision removed at the earliest.

CROP	1992-93	1993-94	PER-CENTAGE
TEA	47152.60	52601.40	12.00
COFFEE	1048.53	1115.07	6.00
CARDAMOM	131.32	242.65	85.00

Our Association has been working closely with the parent Association PAT on all aspects and it is of great satisfaction to report to this body, they are now making a serious effort to represent on behalf of the industry to bring down our liabilities on agricultural income tax at par with central income tax. We are also making our strong representations on the unrealistic house tax levied on estates by the panchayats. The recent ruling of the MV inspectorate is being challenged and we are hopeful that our case would be disposed off favourably. It has become very clear that we need to have a strong lobby at the secretariat to put forth our point of view to get quick relief to some of our pressing demands like electrification of labour quarters, voltage fluctuations during peak periods etc.

The association members have fully supported the activities of the FPAI in this area. The FPAI conducted workshops on creche ayahs training and has been actively involved in the welfare of the tribal women in this area. It is for the members to take full advantage of this associations' activities for bringing up the levels in our estates. The chairperson of FPAI would be willing to undertake projects on estates if members approach them with specific programmes.

During the year we had excellent industrial relations in the district and most of the issues were sorted by member estates bilaterally. The Association with the co-operation of the unions was able to sign a settlement on festival advance for the next three years.

— **Excerpts from Chairman's address at the 76th AGM of the Nilgiri - Wynaad Planters' Association held in Gudalur, Nilgiris, on December 3, 1994.**

PERSONALIA

NWPA OFFICE-BEARERS

Mr. S. Suryanarayanan has been re-elected Chairman of the Nilgiri - Wynaad Planters' Association (NWPA) for the year 1994-95.

The other members of the Committee are : Messrs. R. Vasudevan, Gautham Mukherjee, A.K. Rampuria, A. Sukumaran, M. Subramaniam and Paritosh P. Manishi.

MPA CHAIRMAN

Mr. S.R.D. Prasad has been re-elected Chairman of the Malabar Planters' Association (MPA) for the year 1995-96. Mr. T.G. Syam is Honorary Secretary.

LETTER TO EDITOR

Mr. P.W. DAVIS

Reference obituary notice which appeared on P. 525 of the December 1994 Chronicle.

Mr. P.W. Davis was also working as Manager in Chamraj Estate from 1938 to 1942 when he was called for military service. He served as Major in 2/10 Baluchis.

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UPASI UPDATE

UPASI COMMITTEE MEETINGS

- ☆ Joint Meeting of Tea Committee, Tea Technical Committee and Task Force on Promotion : 5th January 1995.
- ☆ Spices, Rubber, Coffee and Tea Committees: 27th January 1995.
- ☆ Trustees and Executive Committee : 28th January 1995.

WORLD BANK PROJECT

The proposal on seeking World Bank assistance for the development of the tea industry is under the consideration of the Tea Board. We have suggested that funding could be sought for productivity improvement, strengthening research as also extension activities, modernisation of factories, quality improvement, small grower development, managerial development and training, market promotion both at home and overseas, infrastructure development, etc. The Tea Board is taking up the matter, at the first instance, with the Ministry of Commerce.

TEA AUCTIONS IN LONDON

In addition to landed tea sale in London auction, the Government of India had approved in 1993 India's participation in the FOB Auction Sale in London. The Tea Board has informed that the Government has now conveyed approval to the adoption of the system of CIF off-shore Auction sales of Indian tea in London, subject to the condition that EXIM Control Regulations are adhared to. Such CIF Off-shore Auction sale shall be as per conditions laid down by the UK Tea Association, details of which can be obtained by interested members from the Director of Tea Promotion, Tea Board, Calcutta.

TRADE FAIR

The Tea Board has informed that they will be participating at the Kuwait International Fair during 25-31 March, 1995. Members desirious of availing the opportunity to display/promote their packaged teas during the fair, may send a representative range of their products (packets/chestlets/caddies etc.) in sufficient quantities to the Ambassador, Embassy of India Kuwait, Diplomatic Enclave, Arabian Gulf Street, P.O. Box No. 1450, Safat 13015, Kuwait. (Tel. 00-965-2530600, 00-965-2530612, Tlx : 22273 INDEMB KT, Fax : 00-965-2525811). Prices and product literature may be sent for possible trade negotiations. Exporters may also consider sending their representatives to respond to the enquiries and interact with consumers/buyers from Board's stall. Board's office in Dubai (Tea Board in India, Indian Trade Centre, P.O. Box. 2415, Dubai, UAE, Tel : 522798 / 525208, Tlx : 46996, Fax : 528571) may be kept informed about the consignments being sent for the fair.

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TEA REPORT

The Tea Board office at Brussels has prepared a Report on the tea market situation in Europe with emphasis on the European Union region. The full report contains detailed statistics, list of importers and country profile. Copies are available at UPASI Secretariat at the cost of Rs. 75 each, (including postage).

TEA BOARD BULLETIN

With a view to providing the Indian exporters on a regular basis with various information relating to overseas tea markets profile, trade enquiries, Govt. notifications, major happenings in Indian and International tea situation etc., they have decided to introduce a monthly bulletin title "Tea File" to be published around first week of every month. The publication normally would be of eight pages. The first issue is proposed to be brought out in the first week of April 1995. The subscription rate is Rs. 300 a year year. With a view to finalising the subscription list, the Board has requested that interested members may write to the Director of Tea Promotion (HQ), Tea Board, Calcutta, specifying the number of copies required and the name and address along with a DD in favour of Tea Board, Calcutta for the requisite amount.

TEA PACKING

UPASI Tea Committee has recently considered the usage of tea guard lining while packing tea in plywood chests. This material is made of paper laminated to 9 micron Aluminium Foil and provides sufficient barrier properties to the tea. It is said that other than A.R.E. buyers for all export markets including CIS countries and Europe have accepted tea guard lining as a standard inner liner for Orthodox teas. Tea guard lining to be used is as per specifications laid down by the ISI. Orthodox teas in North India auction centres are already being packed with tea guard lining and the use of 20 MIC Aluminium Linings has been restricted to the bare minimum. The UPASI Tea Committee has proposed that members may adopt 9 MIC tea guard lining with the effect from 1st April 1995.

The question of shifting from polylined jute bags to HDPE Woven Sacks for packing tea meant for domestic market is also engaging the attention of the tea interests. It is reported that the Coonoor Tea Trade Association has already permitted the usage of such sacks.

TEA VENTURE IN RUSSIA

The Tea Board has informed that the Indian Consul General at Vladivostok, Russua has received a request from a local party seeking assistance in establishing joint venture with an Indian party on supply and tea packaging in Vladivostok on the basis of Indian technology. Member companies wishing to negotiate could contact Mr. A. Petrakovich, President, Primorski Chai Co. Ltd., 7, Tigrovaya Street, Vladivostok, Russia 690 007 (Tel : 4232 - 212995, Fax : 4232 - 220247).

RUBBER IMPORTS

In response to the demand of the tyre industry, the Government of India has agreed for the issue of import licences for 10,000 tonnes of natural rubber.

SPICES BOARD

As already reported, the Spices Board has recommended to the Government that the administrative control of the Board be shifted to the Union Agriculture Ministry from the Commerce Ministry. The gift of the recommendations of the Spices Board are as under :

"The Government may consider the shifting of the Spices Board to the Ministry of Agriculture, subject to the following :-

- The Spices Board should retain its separate identity and function as the exclusive nodal agency of the Government of India for Spices Development.
- The special status and importance of cardamom as a plantation crop should be retained and the interest of the cardamom growers fully protected.
- The Indian Cardamom Research Institute (ICRI) should be continued as a specialised research institute for cardamom and retained with Spices Board. Personnel policy of the ICAR may be adopted for the scientists of this Institute.
- All developmental activities pertaining to all spices should be the responsibility of the Spices Board.
- Apart from protecting the status of cardamom, the interests of the labourers engaged in the cultivation of cardamom under the Plantations Labour Act and other similar acts should be protected.
- The service conditions, benefits and privileges of the employees of the Spices Board should be fully protected.
- The export focus of the developmental programmes should be retained and exporters given adequate representation in the Board.
- All aspects relating to export should be taken care of by the Ministry of Commerce.
- The Spices Cess Act, 1986 should be abolished."

There is also, reportedly, a proposal to revive the Spices Export Promotion Council.

FERTILISER

Members desirous of purchasing Ammonium Sulphate for estate purposes could contact the following :

1. The Chief (Fertiliser), Steel Authority of India Ltd., Central Marketing Organisation, Poddar Court (9th Floor), 18, Rabindra Sarani, Calcutta - 700 001. (Tel : 30-3301, 30-3227, Tlx : 021-7496, 021-2595).

2. The Chief Sales Manager, The Fertilisers & Chemicals Travancore Ltd., Marketing Division (Head Office), P.B. No. 15, Udyogamandal - 683 501. (Tel : 0484-8-56101, Fax : 0484-8-58125, Kochi).

ACC No. 5512

UPASI Update

PRICE TREND (Rs./Kg.)

CROPS	LATEST		6 MONTHS AGO		YEAR AGO	
TEA	C.T.C.	ORTH.	C.T.C.	ORTH.	C.T.C.	ORTH.
COCHIN	41.63	39.31	31.61	27.26	42.00	41.44
COIMBATORE	39.70	43.25	25.82	26.69	41.35	39.71
COONOOR	38.85	35.96	25.19	26.08	35.62	39.74
AVERAGE	40.33	39.68	28.08	26.91	39.40	40.30
COFFEE						
a) **Private Auction**						
PLANT - A	122.17		145.25		44.64	
ARA.CHY. AB	100.63		136.20		38.00	
ROB.CHY. AB	88.00		101.81		46.03	
b) **Coffee Board Auction**						
PLANT - A	113.31		144.73		44.14*	
ARA.CHY. AB	104.16		132.15		38.89*	
ROB.CHY. AB	87.11		116.93		35.61*	
RUBBER						
a) **Kottayam**						
RSS LOT	44.00		28.50		25.00	
RSS IV	46.00		35.00		26.50	
b) **Kuala Lumpur**						
RSS I	51.86		39.33		25.07	
SPICES						
CARDAMOM	261.57		287.19		316.59	
PEPPER	73.50		61.00		44.25	
CLOVES	95.00		70.00		90.00	
NUTMEG	110.00		55.00		87.50	

* Export Auction

TEA CROP - SOUTH INDIA - (TONNES)

DECEMBER

1994 : 13,452
1993 : 15,354
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JANUARY/DECEMBER

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"POPULIST" BUDGET?

Most of the newspapers and many of the businessmen have labelled the Union Budget as "Populist" The way the labelling has been done is to convey that the Budget emphasis is not on a sound economic management; but to appease the masses, keeping an eye on the next election.

In a democratic set up, Government has to take actions which receive mass support. Government has to always do the job of balancing. In the face of disinformation campaign by the critics of market economy that the same is antipoor, the Finance Minister had to perforce present a Budget with human face to reforms. This is so everywhere in the world. Hence there is nothing unique.

Pundits of trickle down theory are becoming less and less in number as years go by. Fruits of development have largely gone to the rich, upper and lower middle classes. Those below the poverty line have gained very little.

Added to the above is a new dimension and that is the tilt towards market economy. Critics galore saying that the prosperity the country is achieving has not percolated to the masses. It does not happen in such a short time. Yet the fact is that critics have an evocative issue to influence the masses. The Government had to counter the simmering discontent thus created.

A number of sound economic arguments could be advanced against Mid-day-meal Scheme and this is what the intelligentsia did when the Mid-day-meal Scheme was introduced years back by MGR. But now reluctantly most agree that the Scheme has many merits. School dropout level has come down. The poor do have the satisfaction that their children at least have one full meal a day.

Old age pension, some financial relief to landless labourers, some help in making available dwelling unit, etc. announced in the Central and State Budgets have to be measured from the human angle. Yes, there is a problem of siphoning; but because there is some siphoning the schemes cannot be condemned.

Coming to plantation sector vis-a-vis Union Budget, non-extension of 80 HHC benefit under Income Tax fully for tea exports as requested by the industry and disallowing depreciation on tea bushes with retrospective effect are the major disappointments.

More worrisome is the apathy of State Governments to fall in line with the direction the Central Government has taken with the management of economy. Deregulation, veering towards market economy and rational tax structure, are the three main planks of the Central Government during the last three years. Corporate tax rates and Excise and Customs Duty levels are being slashed budget after budget to slowly integrate Indian economy with world economy. But how this can be achieved when States and Commodity Boards stick to the old rigorous and high tax regime and plethora of controls? Agricultural Income Tax continues to be levied at 65 per cent. Controls on planting, production and marketing continue. Rupees thousand-crore car manufacturing unit can be set up without licence, but not a curing work for coffee costing less than one crore of rupees. Another dimension to the scenario is that though Coffee and Tea Boards are bodies under Central Government, contrary to the signals of Central Government, these Boards still want to retain all their regulatory powers under one pretext or the other.

What unfortunately the State Governments and the Commodity Boards do not realise is that the plantation industry is being drawn to the inexorable forces of market economy, both internal and external. How could the plantation sector compete when it is chained? Should not levelling of the ground start before they start playing in the field?

It is not that the track record of the plantation sector so dismal to warrant such throttling down. Be it production growth or export increase or revenue share of the State Governments or labour welfare measures, plantation sector has been holding its head above many other sectors. This sector is confident of facing competition. It is capable of achieving higher production growth. It is not seeking reliefs. But, is it unfair to demand that it should get the same treatment as other sectors are getting under the process of liberalisation and market economy? ✪

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EDITOR : D. Ravindran. Printed and published by Dr. D. Padmanaban at Kalaikathir Achchagam, Coimbatore 641 037.

Opinions expressed in this journal are not necessarily those of the UPASI.

STRATEGIES FOR A SMALL COFFEE PLANTER FOR YEAR 2000 AND BEYOND

M. PANDURANGA VITHAL
Indian Institute of Plantation Management, Bangalore.

The Indian economy started its journey of economic liberalisation and globalisation in 1991 with the advent of the new industrial policy. Around the same time, Indian coffee industry has attracted attention because of a shift in government policy towards marketing Indian coffee. The introduction of ISQ was the starting point. This supposedly small change had a snowballing effect. The ISQ had become 50 per cent FSQ in a short time. The present mood of the coffee industry appears to be that of a 100 per cent FSQ situation in the near future. This virtually means a FULL FREEDOM for market forces, both in the domestic and international markets. The two processes of economic liberalisation and full freedom for market forces in coffee industry together at a macro level present a well balanced and synchronised view at the outset. An attempt has been made in this article to probe this view from the micro point of view of an individual coffee grower. This exercise is undertaken with a view to generate strategic options for the grower to meet the twin objectives of *SURVIVE* and *PROSPER* in the free market.

The free market situation provides access to domestic as well as international markets with ease. The sheer size of these together presents an exciting and inviting opportunity for an economic entity. In order to exploit such opportunities an individual planter needs preparation at his estate level. The estate then is expected to produce a marketable surplus. This in turn means better utilisation of estate area by inter-cropping and mixed farming techniques, producing better quality of coffee by efficient disease management, improved methods of preparing coffee for the market. The essence of such preparation in terms of Strategic options means : Diversification and Upgradation of level of operations. Such strategic options require ensuring improved infrastructural facilities.

- Transporting goods and people.
- Communication of information regarding supply, demand and price situations from the markets.
- **Commitment of Resources :** Financial commitments from Bankers, since the growers may not be in a position to devote resources towards all the above requirements.

The preliminary step for generating any strategic options can be done by undertaking an analysis of the experience and current situation of the economic entity. In this industry, at a macro level the international prices which in themselves are dynamic also influence the domestic prices considerably. Hence, the pricing decision is out of purview of the small grower.

This makes it clear that in a competitive environment the grower has to concentrate on establishing a *competitive cost advantage* at his estate level. Establishing cost advantage is possible when the grower adopts a three dimensional strategy of improving the productivity (per acre and per worker), efficient utilisation of available resources and controlling costs. The grower may have to undertake *reengineering* of his estate.

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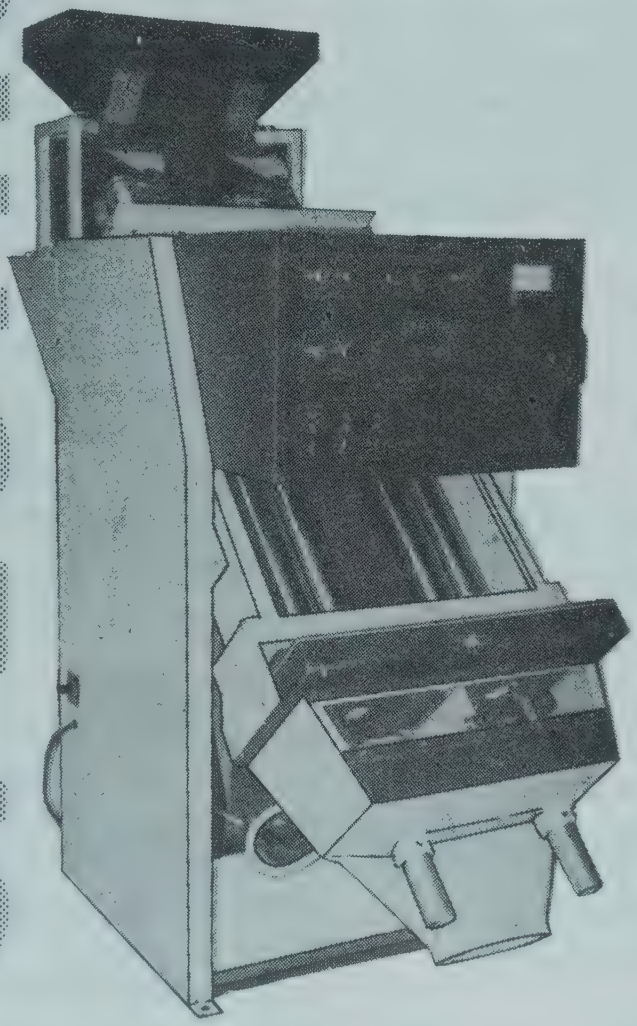

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MAGNUM INTERGRAFIKS

Let us look at some of the estate costs. All costs have to be financed. The cost of financing itself, in the first place, is an important element of his decision making. The source of financing is dependent upon the Credit system.

The Indian Experience

In India the accessible credit system for the grower is the Banking system which is typically infested with rigid controls (mostly based on recommendation of the Coffee Board) and / or the schemes offered by the Board. Since the overall monetary policy of the economy is run with a deficit financing system, it often results in inflation which adversely influences the cost of financing.

The Coffee Board plays a vital role in protecting the interest of the small growers as about 97 per cent of the coffee holdings are small holdings of less than 10 hectares in size (according to the Ministry of Commerce Annual report for 1993-94)[1]. India accounts for around 3 per cent of the coffee produced in the world and about 2 to 2.3 per cent of the global exports[2]. Under its developmental role, the Board extends the following credit facilities in the form of loans and subsidies for the development/improvement of coffee states especially to the small grower sector :

1. Intensive Cultivation Loan
2. Replanting Loan/Replanting Loan-cum-Subsidy
3. Extensive Cultivation Loan
4. Special Purpose Loan.
5. Crop Hypothecation Loan
6. Hire Purpose Loan
7. Expansion Subsidy
8. Replanting Subsidy
9. Interest Subsidy

Besides the above Loan and Subsidy Schemes, "Differential Rate of Interest Scheme" was also continued for the benefit of weaker sections of coffee growers (hectares and below) in traditional areas and all tribal coffee growers in non-traditional areas. These growers are granted the following four types of loans at a lower rate of 7 per cent p.a. for weaker sections and 4 per cent p.a. for tribals :

1. Intensive Cultivation Loan
2. Replanting Loan
3. Extensive Cultivation Loan
4. Special Purpose Loan[3].

The International Scene

From the international point of view the scene is not much different. This issue has been given sufficient attention in the ITC Commodity Book as below :

> The trade in good-quality coffee has always been and will always be complex. It should be managed at all levels buy technicians and professionals with adequate product knowledge. The goals must be to market a high-quality product to sophisticated consumers : smaller producers cannot hope to realise this objective without painstaking attention to detail along the entire production and marketing chain. This has been neglected in many countries in recent years, but the return of the free market has highlighted the issue once again, especially for smaller producers.

The need for care and attention has always existed. In recent decades it may have been relegated to the background by complacency and over-shadowed by the complexities of the controlled market. The issue has, however, regained its past importance, particularly in regard to the so called gourmet and ethnic markets which have grown phenomenally. Those who wish to profit from these developments need to provide a reliable and stable product. This cannot be achieved without good internal quality control and adequate incentives[4].

Internal Pricing and Access to Credit

Pricing and Access to credit are the two most important financial concerns of growers. Larger growers and estates can normally obtain finance at commercial rates of interests, whereas most smallholders throughout the world do not have this facility. For them to access to credit is probably more important than pricing. The lack of credit facilities often forces small growers to take up loans at usurious rates of interest, perhaps as much as 100 per cent over a few months. Growers may also be compelled to harvest prematurely in order to acquire cash. The coffee harvest does not always coincide with peak periods of cash needs and smallholders normally lack the financial resources to bridge these gaps themselves. Whether producer prices fluctuate or are fixed, only reasonable access to fairly priced credit ensures that small growers actually realise these prices. This is probably the single most important collection marketing issue in many producing countries. Pricing and Credit are therefore inextricably linked[5].

Access to Credit

The importance of credit to smallholders can be judged by the following comments in the ITC Commodity Handbook :

> Smallholders must also be able to afford production inputs, general living expenses, etc., but . . . the receipt of sale proceeds does not normally coincide with times of peak demand for finance. Most smallholders have little or no cash reserves and therefore, require credit until they receive the funds for their crop. A smallholder's access to formal credit normally depends on two things : His ability to offer suitable collateral and the availability of banking services in his area. If a smallholder has no access to formal credit he is often either forced to obtain informal loans from collectors and traders at usurious rates, or to harvest and sell his coffee prematurely. The timing of sales is often disadvantageous to the grower with no access to credit as higher prices for some crops can be obtained later in the season; unfortunately, he usually cannot afford this delay. Although the role of collectors and traders is extremely valuable — without them smallholders might not have access to any form of credit — fairly priced credit is what smallholders need most.

The development of rural credit facilities is a central preoccupation in most producing countries. Access to reasonably priced credit can bring increased receipts to the grower because of lower interest rates and because he no longer needs to harvest prematurely and therefore offer coffee of inferior quality. The lack of credit often results in merely indicative of official farm gate prices: for reasons implied above, smallholders' net receipts are frequently much lower, and sometimes only half of the official price. When affordable credit is provided, there is an improvement in both the quantity and quality of coffee delivered by farmers. Efficient credit arrangements can, therefore, be of much greater benefit than investment in sophisticated technology.

In conclusion, "there are unfortunately no quick and easy answers to the question of smallholder credit. As long as growers do not properly organise themselves, most will continue to depend on expensive credit . . ."[6]. Some of the banks are seriously reviewing their stand with respect to the credit to the coffee growers. One bank as a result of the 50 per cent FSQ decided to extend credit to the grower on the basis of a receipt issued by the curing works from this season.

Implementation of Strategies : Who will bell the cat?

The individual planter would definitely like to take advantage of

REGULATION OF NEWSPAPERS (CENTRAL) RULES 1956

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I, Dr. D. Padmanaban, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd./-
D. Padmanaban
Signature of the Publisher

Date : 1.3.1995

a free market situation. This covers his objective of Growth (assumed to be with profitability). But on one's own it is a gigantic task. Fervent supporters of individual growers cannot deny the fact that the individual grower had little exposure to the market till recently. The impact of the recent exposures to the market have not been thoroughly examined. Therefore, there arises a need for an agency which could bell the cat on his behalf. Since the future is in a free market, such a service from any agency cannot be expected to come free of charge. This is once again a developmental cost which is new to the grower and therefore, he may not be in a position to bargain about (or control) the same. There lies his fear for survival. This is the dilemma which needs a careful analysis.

Some of the options for such an agency could be considered here. They are :

> **Agency like the Coffee Board :** which always played the so called developmental-cum-marketing role. While they may provide better clones and pesticides etc., their ability to influence the bankers and arranging infrastructural facilities may be limited.

Cooperatives : The industry experience with the cooperatives has been very limited.

Associations : In the past and the present they have played the role of spokesman. Occasionally some developmental role. In the possibility of the growers with large holdings dominating the associations, the protection to all growers and small growers in particular may not gain a priority. The difference in size of the holdings is a determining factor for one's shock absorbing capacity.

Private Initiative : An initiative could be initiated by private or corporate entities to take up these tasks with commercial spirit. They can set up business support centres. Objectives of such a centre are in tandem with the goals of individual growers. A framework in this direction was developed by Mr. V.I. Chacko.

Mergers and Acquisitions by giant corporations : This is an option from the industry point of view. Like the big fish eating the small fish, this is a realistic option in a free market. Since this option is in full contravention of the twin objectives of the individual grower, this is virtually a no-option.

CONCLUSION

In conclusion, we argue that the individual planter needs to have a relook at the strategic options available in the future of the coffee industry to ensure better future for himself. The grower should attempt to : establish a cost advantage, better management of credit, ensure good quality and should create a linkage with reliable market intelligence system. One way of ensuring success in a liberalised economic scene is to be a member of an agency which can handle the issues of small growers strictly on a commercial basis.

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[1]. Ministry of Commerce, Government of India, Annual Report 1993-94, p. 62.

[2]. Ibid., p. 63.

[3]. Ibid., p. 63.

[4]. ITC Commodity Hnadbook, Coffee : An Exporter's Guide, 1992, p. 58.

[5]. Ibid., p. 58.

[6]. Ibid., p. 61.

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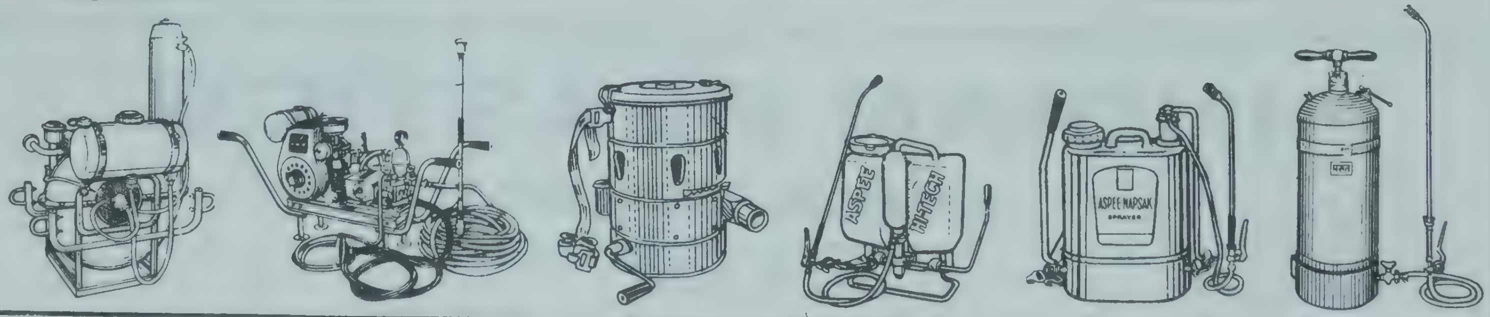

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TEA AND COFFEE IN MEXICO AND LATIN AMERICA

by SANTA RIVELLI*

Mexico and the rest of Latin America are the most developed and industrialised parts of the third world. However, the region's longstanding reliance on import substitution, huge government deficits, mounting foreign debt and ineffective inflation control systems all have impinged on economic growth. Their performance in the 1980s lagged behind other regions, but there is a growing feeling that Mexico and the Latin American region are set for a period of stable and, perhaps, vigorous growth in the 1990s and beyond.

With all the fervent debate about the North American Free Trade Agreement, and its advantages and disadvantages on industry, trade and the consumer, Mexico seems well placed for significant expansion with the signing of the pact. NAFTA will mark Mexico's transition from oil to a diversified and highly industrialised basis for its export trade. Whether it will alienate itself from its southern counterpart or be used by its northern alliance members as a stepping stone to Latin America as a whole is yet to be seen.

When looking at hot drinks consumption (coffee, tea, hot chocolate and food drinks) in the region, Latin America ranks third after western Europe and North America, with a consumption figure of 1,384,000 tonnes. Latin America tops the sales value growth league, with hot drinks sales up 12 per cent from 1988 to 1992. However, this increase was, in part, a result of the high levels of inflation experienced by certain countries in the region.

TEA AND COFFEE PRODUCTION

Coffee is a key source of foreign exchange earnings for many Latin American nations. Stable trade conditions are, therefore, crucial to these economies. However, with a backdrop of such largely static demand variables as climate unpredictability, changing market conditions and political instability, pricing and general trade are made difficult to achieve. Latin America dominates world coffee production, but the region's share of the world total has fallen from roughly 56 per cent in 1988 to 46 per cent in 1992.

Five Latin American countries feature in the top 10 table of world coffee producers, with Mexico finishing fourth (see Figure 1). In 1992, Brazil, the leading producer with 26,000,000 60kg bags of green coffee, saw its production fall by almost 40 per cent during 1988-1992, but the country still accounts for 25 per cent of the total. Colombia, second with 15 per cent, increased its output by 22 per cent over the same period. Mexico ranks fourth with 4,766,000 60kg bags, an increase of 2.4 per cent in production from 1988.

Latin America also has witnessed a steady increase in tea imports. In 1988, it amounted to 12,401 tonnes. Five years later, the figure rose to 13,780 tonnes, a reasonable growth rate of 11.1 per cent. Chile is the

FIGURE 1 : The World's Leading Coffee Producers 1988-1992

By crop year, '000 60kg bags of green coffee

	1988	1992	% growth 1988/1992
Brazil	43,014	26,000	(39.6)
Colombia	12,756	15,600	22.3
Indonesia	6,273	7,471	19.1
Mexico	4,654	4,766	2.4
Ivory Coast	3,523	4,000	13.5
Ethiopia	2,883	3,600	24.9
India	1,941	3,333	71.1
Guatemala	3,052	3,290	7.8
Uganda	2,553	3,200	25.3
El Salvador	2,501	2,850	14.0
Rest of World	24,774	29,175	17.8
WORLD TOTAL	107,924	103,285	(04.3)

Source : ICO / Euromonitor.

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COFFEE CONSUMPTION

Latin America is essentially a coffee-drinking region; in 1992, it ranked third in the world, with a market size of 983,000 tonnes, a 19 per cent share of the world market (see Figure 3). In volume terms, the Mexican coffee market in 1992 was 78,000 tonnes, claiming only eight per cent of the Latin American market, two per cent less than the 1988 figure. In terms of retail distribution, the retail/horeca split for Mexico follows the basic trend for other major markets (with the exception of Italy) throughout the world; 55 per cent of it was through retail sales and 45 per cent through horeca sales. Bearing this in mind, the horeca channel still generates higher returns per volume unit sale than the retail sector.

For the most part, coffee is drunk by the whole population (with the exception of Chile) and it appears to be considered almost as a staple part of the diet; this is largely because it is available in such large quantities as a result of domestic production. There is no obvious cultural reason why Latin Americans should drink coffee, and it does not appear to perform a significant ritual in social gathering. The main determinants appear to be its availability and its low cost.

The amount of coffee Mexicans consume a head per year falls well below the regional average of 2.14 kg (see Figure 4). In 1992, per capita consumption was just under 1 kg.

Latin America's coffee addicts are the Brazilians, who consume 3.55 kg of coffee in a year, followed by the people of Venezuela, with 2.6 kg and Colombians at 2.45 kg. The Peruvians drank the least; their quota was slightly less than half a kilo.

TEA CONSUMPTION

Tea is consumed in almost negligible amounts, with the exception of Chile and Argentina. Chile accounts for more than 85 per cent of all tea imported into South America, while Argentina dominates the Latin American market in terms of consumption. A total of 145,000 tonnes was brewed in Argentina.

Mate, Argentina's national speciality hot drink, is consumed in vast quantities and is most enjoyed when consumed socially (see Figure 5). The tea is placed into a special thermos-type cup with spoonfuls of sugar and left

FIGURE 2 : The World's Leading Coffee Exporters 1988-1992

By crop year, '000 60kg bags of green coffee

	1988	1992	% growth 1988/1992
Brazil	36,014	17,000	(52.8)
Colombia	10,956	14,200	29.6
Indonesia	5,106	6,229	22.0
Ivory Coast	3,306	3,950	19.5
Mexico	3,054	3,765	23.3
Uganda	2,483	3,125	25.9
Guatemala	3,052	3,290	7.8
El Salvador	2,331	2,670	14.5
Ethiopia	1,716	2,400	39.9
India	1,126	2,333	107.2
Rest of World	20,535	24,136	17.5
WORLD TOTAL	89,379	82,798	(07.4)

Source : ICO / Euromonitor.

FIGURE 3 : Latin America/Caribbean : Consumption of Coffee 1988-1992

	1988	1992	% growth 1988/1992
Brazil	540.0	555.0	2.8
Colombia	102.0	84.0	(17.6)
Mexico	102.0	78.0	(23.0)
Venezuela	50.0	54.0	8.0
Argentina	30.1	33.0	9.6
Ecuador	20.6	20.9	1.5
Peru	11.4	11.0	(03.5)
Chile	7.0	7.5	7.1
Others	145.0	140.0	(03.4)
REGIONAL TOTAL	1008.1	983.4	(02.5)

Source : Euromonitor.

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to stand for a while. Once the mate is ready, it is drunk through a metal straw and passed around for everybody to savor.

Argentina has the highest per capita consumption of tea (although this is primarily the local speciality, yerba mate), not only in Latin America, but in the world, at 4.38 kg per person (see Figure 6). Libya and Ireland follow suit in the world league, while Chile appears in 16th place in world terms, but second in the Latin American league, with 0.88 kg.

FUTURE OUTLOOK

Population growth is the main factor that will account for the volume growth in the Mexican and Latin American coffee market. Value growth at a faster rate is possible in both assuming the continued growth in disposable incomes, which would allow greater segmentation of the market, and more scope for added value sub-sectors to develop. Per capita consumption in the region is forecast to fall marginally, from 2.14 kg in 1992 to 1.87 kg in 2000.

Tea consumption in the region, as a whole, is considerably low (173,000 tonnes), when compared to other such regions as Asia and Europe. Argentina, on her own, dominates the Latin American tea market. However, the Latin American tea market is forecast to decrease to 155,000 tonnes in the year 2000. Per capita consumption is forecast to fall to 0.29 kg in the year 2000.

Geographical expansion strategies have focused primarily in other developing regions, particularly eastern Europe. Some of the major players are looking at Latin America, especially Mexico, with the acceptance of instant coffees in recent years as proof that the apparently saturated markets of the producer countries still can be converted to more convenient, processed coffee and, in doing so, can create market opportunities for the international manufacturers.

— WORLD COFFEE & TEA

FIGURE 4 : Latin America : Per Capita Consumption of Coffee 1992

	kg per capita per annum
Brazil	3.55
Venezuela	2.60
Ecuador	1.94
Argentina	1.00
Mexico	0.87
Chile	0.55
Peru	0.49
REGIONAL AVERAGE	2.14

Source : Euromonitor.

FIGURE 5 : Latin America/Caribbean : Consumption of Tea/Mate 1988-1992 ('000 tonnes)

	1988	1992	% growth 1988/1992
Argentina	155.0	145.0	(06.5)
Chile	10.7	12.0	12.1
Brazil	12.0	10.0	(16.7)
Peru	3.0	3.0	—
Ecuador	1.6	1.0	(37.5)
Bolivia	0.2	0.2	—
Mexico	0.1	0.1	—
Others	3.0	3.0	—
REGIONAL TOTAL	184.6	173.3	(06.1)

Source : Euromonitor.

FIGURE 6 : Latin America : Per Capita Consumption of Tea/Mate 1992

	kg per capita per annum
Argentina	4.38
Chile	0.88
Peru	0.13
Ecuador	0.09
Brazil	0.06
Mexico	Negligible
REGIONAL AVERAGE	0.38

Source : Euromonitor.

FIGURE 6 : Latin America : Per Capita Consumption of Tea/Mate 1992

	kg per capita per annum
Argentina	4.38
Chile	0.88
Peru	0.13
Ecuador	0.09
Brazil	0.06
Mexico	Negligible
REGIONAL AVERAGE	0.38

Source : Euromonitor.

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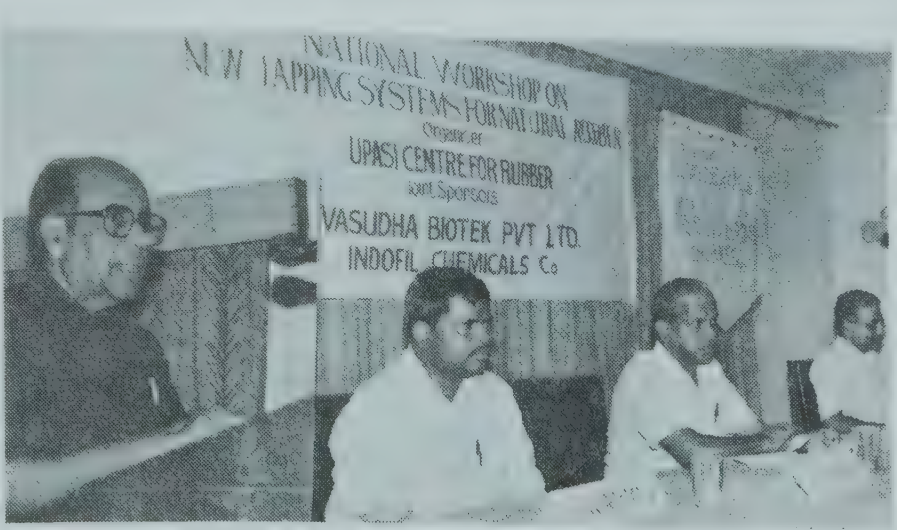
NEW TAPPING SYSTEM FOR NR

With the objective of increasing awareness of the state of the art in exploitation techniques in India as well as in Malaysia amongst the planting community for increasing productivity of rubber, a Workshop on the New Tapping System for Natural Rubber was organised by the UPASI on 10th February 1995 in Kottayam. A report.

The presentations were made by the top experts of the corporate sector planting companies, the Joint Director of exploitation section of the Rubber Research Institute of India as well as the UPASI R & D Centre for Rubber.



Mr. George John Ancheril, Past President of UPASI, making his inaugural speech. Others (L to R) : Dr. K.R. Vijayakumar, Jt. Director (Exploitation) RRII, Mr. P.K. Narayanan, Rubber Production Commissioner, Rubber Board and Mr. A.V. George, Convener, UPASI Rubber Technical Committee.

The speakers were Dr. K.R. Vijayakumar, Jt. Director (Exploitation), Mr. C.M. George, Technical Consultant, Harrisons Malayalam Ltd. (in lieu of Mr. K.A. Kuttaiah, Executive Director), Mr. O.T. Jayachandran, Vice President, A.V. Thomas & Co., and Mr. Jacob Mani Mannothra, Advisory Officer, UPASI R & D Centre for Rubber.

Mr. A.V. George, Convener of UPASI Rubber Technical Committee, welcomed the participants.

Mr. George John Ancheril, Past President of UPASI in his inaugural speech highlighted the need for Research & Development aimed at increasing productivity a introduction of techniques like RRIM Flow, Reactor Flow, shorter taps and novel stimulation regimes like GEL system. He also called for the development and introduction of latex diagnosis for rationalising tapping systems and stimulation regimes. Mr. George John Ancheril also noted that it was after the workshop organised by the UPASI R & D Centre in 1991, that the CUT systems capability of substantial productivity increase, gained wider attention of the planting community in India.

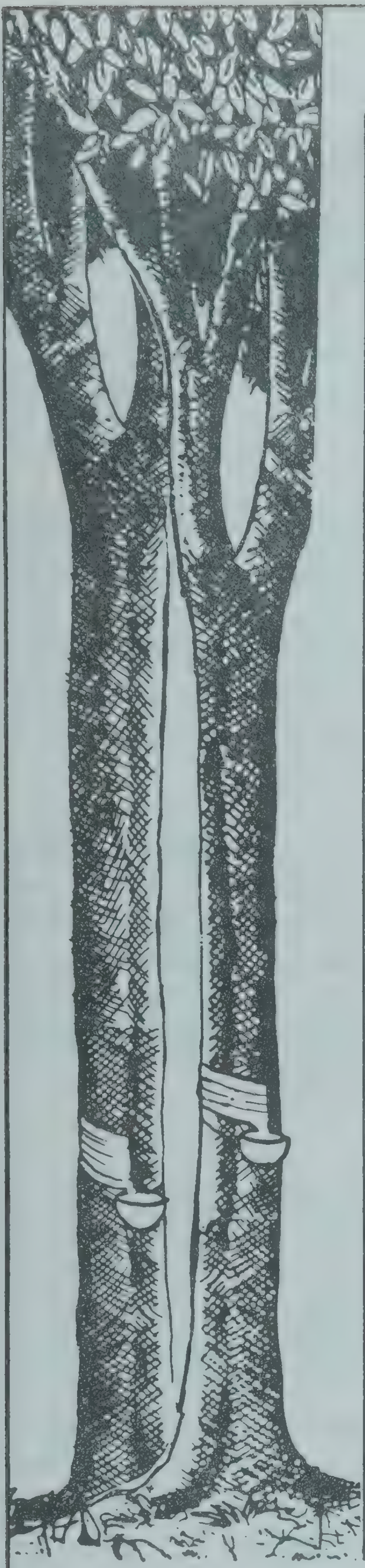
Mr. P.K. Narayanan, Rubber Production Commissioner, Rubber Board, in his theme presentation stressed the importance of developing and popularising appropriate technologies for increasing productivity. He also stressed the need for adopting techniques like RRIM Flow, Reactor Flow, Ethalysed systems coupled with latex diagnosis for making a quantum jump in production.

Session on new tapping systems : This session was chaired by **Mr. P.K. Narayanan,** Rubber Production Commissioner.

a) **Emerging exploitation techniques for increasing productivity in Rubber plantations — Dr. K.R. Vijayakumar, Jt. Director (Exploitation), R.R.I.I.**

Dr. K.R. Vijayakumar reviewed the developments in low frequency tapping systems, fixing of stimulation schedule via, analysis of clone typology and latex diagnosis, feasibility of commercial application of latex diagnosis. He also highlighted panel management technique, periodic tapping and the use of gaseous form of stimulants, Ethepon as a booster dose while opening trees and during resumption of tapping after tapping holidays. His conclusions pointed to the need for extensive studies on d/4 frequency, periodic tapping with high yielding clones and to study the breakeven yields by low frequency systems of tapping.

b) **Recent trends in the harvesting of the crop from Rubber plantations — Mr. C.M. George, Technical Consultant, HML :**



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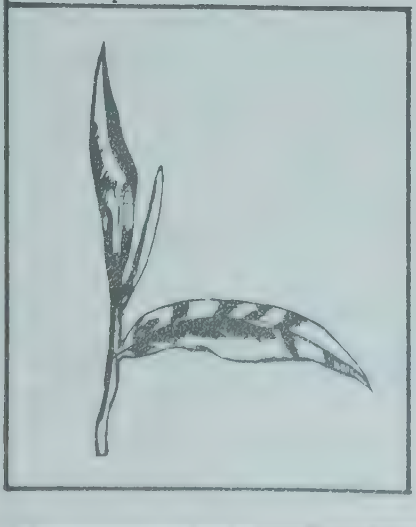

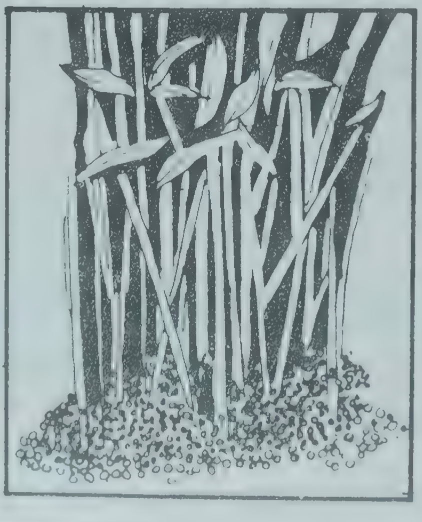

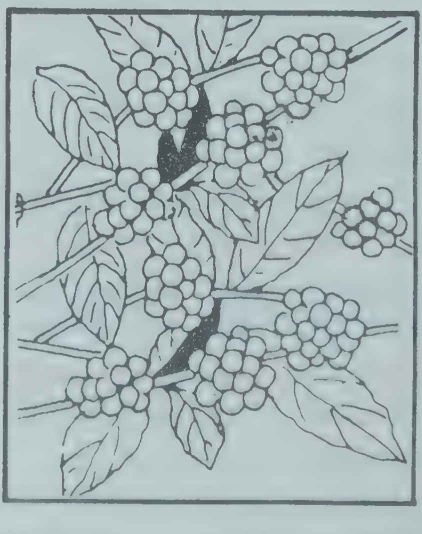

This paper highlighted the recent trends in choice of tapping systems, factors to be considered for selection of tapping systems, attributes of the best tapping system, puncture/micro tapping and importance of low frequency tapping systems and the advantages and disadvantages of RRIM Flow. A SWOT analysis of CUT system was also presented. Mr. C.M. George emphasised the need for developing latex diagnosis for sustaining high productivity which along with low frequency tapping systems is the basis for Ivory Coast to emerge as the number one in productivity among rubber producing countries. He also apprised of the commercialisation of latex diagnosis in Indonesia and Malaysia.

c) **Tapping systems for increasing productivity — Mr. O.T. Jayachandran, Vice President, A.V. Thomas & Co. :**

According to this paper the contribution of productivity is only 38 per cent towards total production. Therefore a mere 10 per cent improvement in productivity can result in additional yield of 55,000 tons/year which would make India self-sufficient in rubber. To produce this without any productivity increase the additional area required would be about 43,300 ha. This paper also brought out the importance of productivity linked wage system, the planned approach and basic principles, as well as trial results of AVT Group in puncture tapping, low frequency trials, CUT and various stimulation regimes, early tapping, economic life of rubber trees, a balanced tapping programme, monitoring systems and efficiency analysis. He stressed the need for rationalising input-output relationships to achieve the least cost production system.

d) **Overview of novel tapping systems — Jacob Mani Mannothra, Advisory Officer, UPASI R & D Centre for Rubber :**

A slide presentation on novel tapping techniques being promoted in Malaysia like RRIM Flow, CUT method, shorter cuts like 1" & 1/8th spiral cuts, Ethalysed & Gel system of stimulations based on slow release of Ethylene and the use of Ethylene gas was shown. The presentation stressed the need for shifting to lower frequency tapping, a rationalised stimulation regime coupled with latex diagnosis to boost sustainable productivity as well as total production thereby increasing profitability from rubber plantations in India.

Discussions and translations : The discussions were lively and Mr. P.K. Narayanan translated the entire proceedings into Malayalam for the benefit of the small growers who attended the workshop.

Participants : The participants consisted of representatives from all the major plantation companies of Southern India, small growers, Presidents of Rubber Producer Societies, Scientists from RRII and Officers of the Rubber Board, representatives of the agrochemical companies as well as the media. The participants came from Karnataka, all parts of Kerala as well as Kanyakumari District of Tamilnadu. There were about 118 participants.

Formation of National Committee on Tapping Systems : A committee was formed to make recommendations for follow up action under the Chairmanship of Dr. K.R. Vijayakumar, Joint Director, Rubber Board. The members consist of the following :

Mr. John Thomas Kottukapally,
Mg. Director
Teekoy Rubbers (I) Ltd

Mr. O.T. Jayachandran,
Vice-President
A.V. Thomas & Co. Ltd

Mr. A.V. George, Director
A.V. George & Co. Ltd

Mr. N.K.A. Nambiar,
Superintendent
T.R. & T.Co. Ltd

Small grower member

Mr. George S. Puthuparamban,
Puthuparambil, Uzhakand,
Erumely

Coordinator :

UPASI R&D Centre for Rubber.

A detailed action programme including labour productivity as well as study and introduction of new tapping systems will be chalked out by the Committee. The terms of reference and further nominees to represent the grower community, governmental organisations and trade union representation, to facilitate productivity linked wage system in view of the future introduction of more efficient tapping systems was mooted.

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INDIAN SPICES : Export Scenario

Dr. C.H. GEORGE*

PRESENT POSITION

India is known as the home of spices. About 63 spices are produced in this country. While spices such as pepper, cardamom, ginger and turmeric have originated in India / Indian sub-continent, clove, nutmeg, cinnamon, vanilla, certain types of chilli and a few herbal spices are introductions.

India is the largest producer as well as consumer of spices in the world. Of the estimated world production of about 16 million tonnes, India's share is slightly over two million tonnes. India is also the major exporter of spices in the world.

The present world trade in spices is estimated around 4,50,000 tonnes valued at US $ 1,500 million. India exported 1,75,532 tonnes valued at US $ 172 million i.e. 39 per cent in quantity and 11 per cent in value in 1993-94.

Export of spices from India has shown significant growth in the last few decades. The average export of 52,500 tonnes valued at Rs. 216.70 million in 1960's has grown to 71,000 tonnes valued at Rs. 830.90 million in 1970's and to 84,000 tonnes valued at Rs. 2036.00 million in 1980s. Export has further increased in 1993-94 to 1,75,532 tonnes valued at Rs. 5,401.24 million.

COMMODITY-WISE EXPORT PERFORMANCE

Pepper, cardamom, chilli, ginger, turmeric, garlic and seed spices like coriander, cumin, fennel, fenugreek and celery are the important spices exported from India. Value-added forms like spice oils and oleoresins and curry powder are also exported in sizeable quantities. The itemwise export of spices during 1993-94 are given in table 1 :

Pepper : Pepper is the most important spice in the international trade accounting for more than 30 per cent volume. The world production of pepper is about 0.2 million tonnes. India contributes 25-30 per cent of the world production. As per the official statistics, the production of pepper in India was 54,930 tonnes during 1992-93. Indonesia, Malaysia and Brazil are the other major pepper producing countries. Vietnam, Thailand, Madagascar, Sri Lanka and China are significant producers of pepper.

Unlike many other spices, a major portion of pepper produced in India is exported. During 1993-94, India made the record export of 46,650 tonnes valued at Rs. 1,796.70 million. USA, CIS

TABLE - 1
ITEMWISE EXPORT OF SPICES FROM INDIA

Commodity	1993-94 Qty. (Tonnes)	1993-94 Value (Rs. million)
Pepper	46,650	1,796.70
Cardamom (Small)	342	138.64
Cardamom (Large)	1,745	115.73
Chillies	33,450	755.92
Ginger	17,150	215.86
Turmeric	25,250	520.00
Coriander	12,750	194.70
Cumin	3,150	153.76
Celery	3,525	58.13
Fennel	2,625	60.56
Fenugreek	4,675	68.12
Other seeds	1,885	35.13
Garlic	2,610	31.66
Other spices	13,650	216.52
Curry powder	3,650	131.48
Mint oil	1,155	216.22
Spice oils & Oleoresin	1,270	692.11
Total	1,75,532	5,401.24

(E) - Estimate

---

* **Executive Director, Spices Board, Kochi - 682 017.**

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countries, Germany, Canada, Italy, UK, France etc. are the main buyers of India pepper.

Cardamom (Small) : India was the largest producer and supplier of small cardamom until 1979-80. The situation changed since then and Guatemala over took India both in production and export. Honduras, Tanzania, Sri Lanka, and Papua New Guinea are the other producers. In 1985-86, India exported 3,272 tonnes valued at Rs. 534.60 million. Exports was only 342 tonnes valued at Rs. 534.60 million. Exports was only 342 tonnes valued at Rs. 138.64 million in 1993-94. The increased use of cardamom within the country and the prevailing high prices are the main reasons for low export. Saudi Arabia, Kuwait and Japan are the major buyers of small cardamom.

Large Cardamom : Large cardamom is the important spice of Sikkim and Darjeeling districts of West Bengal. Nepal and Bhutan are the other producers, During 1993-94, India produced 3,725 tonnes of large cardamom. Export has shown an increasing trend recently. It has gone up from 716 tonnes valued at Rs. 31 million 1989-90 to 1,745 tonnes valued at Rs. 115.73 million in 1993-94. Pakistan, Singapore and UK are the important buyers of large cardamom.

Chilli : Though commercial chilli is an introduced crop by the Portuguese, India is the largest producer. Pakistan, China, South Korea and Bangladesh are the other producers. The world trade in paprika and chilli accounts for about two-third and chilli nearly one-third. As per the official statistics for 1992-93, the production of chilli in India was 7,79,000 tonnes. There is no commercial cultivation of paprika in India.

Chilli export from India has shown remarkable increase during the last few years. Export has increased from 11,967 tonnes valued at Rs. 257.16 million in 1989-90 to 33,450 tonnes valued at Rs. 755.92 million in 1993-94. India exports substantial quantity of chilli to Bangladesh and Sri Lanka. USA, East and West Asian countries are the other important buyers of Indian chilli.

Ginger : India is the large producer of ginger contributing over 30 per cent of the world production. China, Bangladesh, Nigeria, Sierra Leone, Indonesia, Australia and Sri Lanka are the other important producers. The world trade in dry ginger is around 30,000 tonnes.

The exportable varieties are mainly produced in Kerala, which is known by the trade name Cochin Ginger. In 1991-92, the production of ginger in Kerala was 50,274 tonnes.

Export of ginger from India has shown a fluctuating trend during the last five years. Export has gone up from 8,139 tonnes valued at Rs. 126.24 million in 1989-90 to 14,259 tonnes valued at Rs. 218.81 million in 1991-92. However, it declined to 9,517 tonnes valued at Rs. 165.52 million in 1992-93. In 1993-94, it has again increased to 17,150 tonnes valued at Rs. 215.86 million. The fluctuations in domestic production and crop failures in some of the competing countries are the main reasons for variations in export. USA, Pakistan, Bangladesh and West Asian countries are the major importing countries of Indian ginger.

Turmeric : India is the largest producer and supplier of turmeric in the world. China, Peru and Thailand are the other producers. As per the official statistics for 1992-93, production of turmeric was 3,97,400 tonnes. Alleppey Turmeric produced in Kerala is the best variety for colour because of its high curcumin content.

During the last five years, export of turmeric was in the range of 17,000 to 25,000 tonnes. However, export earnings have increased from Rs. 161.39 million in 1989-90 to Rs. 520.00 million in 1993-94. Iran, UAE, Japan, UK, USA and Singapore are the major markets for Indian turmeric.

Garlic : The world production of garlic is estimated around three million tonnes. India contributes about 11 per cent of the world production. korea, Spain, France, Thailand and Egypt are the other significant producers. During 1991-92, the production of garlic in India was estimated as 3,64,000 tonnes.

The export of garlic has increased from 2,210 tonnes valued at Rs. 17.73 million in 1989-90 to 10,282 tonnes valued at Rs. 82.84 million in 1991-92. However, in 1993-94, export has declined to 2,610 tonnes valued at Rs. 31.67 million. Bangladesh and Sri Lanka are the major buyers of garlic from India.

Seed spices : India produces a number of seed spices and the important among them are

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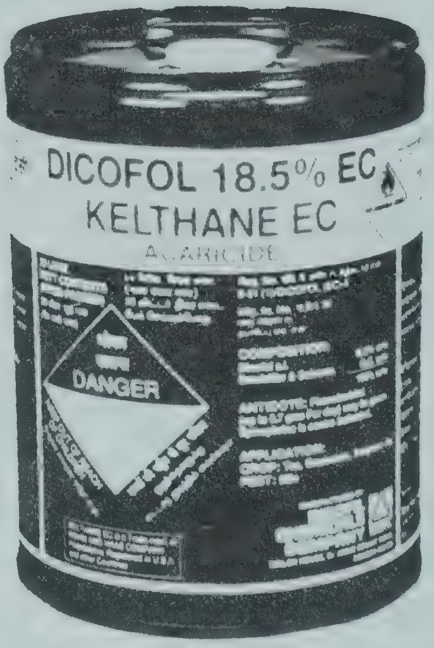

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coriander, cumin, fennel, fenugreek and celery. The world trade in seed spices is around 65,000 tonnes. The major producers of seed spices are Morocco, Rumania, Bulgaria, Mexico, Iran, China and Egypt.

Export of seed spices has shown remarkable growth during the last five years. Export has increased from 19,801 tonnes valued at Rs. 225.36 million in 1989-90 to 28,610 tonnes valued at Rs. 570.40 million in 1993-94, recording growth of 44 per cent in quantity and 153 per cent in value.

Coriander : India has a prime position in the production of coriander. During 1992-93, production was 1,94,500 tonnes. The export has gone up substantially during the last five years. It increased from 2,668 tonnes valued at Rs. 27.84 million in 1989-90 to 12,750 tonnes valued at Rs. 194.70 million in 1993-94. Sri Lanka, Singapore, Malaysia and UAE are the major buyers of Indian coriander.

Cumin : India is the major producer of cumin. During 92-93, India produced 1,35,189 tonnes. The export during 1993-94 was 3,150 tonnes valued at Rs. 153.76 million as against 4,221 tonnes valued Rs. 69.05 million 89-90. Sri Lanka, Singapore, USA and West Asian countries are the important markets for cumin.

Fennel : Production of fennel during 1992-93 was 19,000 tonnes. Export has increased from 2,322 tonnes valued at Rs. 31.09 million in 1989-90 to 2,625 tonnes valued at 60.56 million in 1993-94. Sri Lanka, Singapore, USA and Saudi Arabia are the major importing countries for fennel.

Fenugreek : During 1992-93, India produced 25,372 tonnes of fenugreek. Export during 1993-94 was 4,675 tonnes valued at Rs. 68.12 million as compared to 6.021 tonnes valued at Rs. 42.68 million of 1989-90. Sri Lanka, Saudi Arabia, Korea, Japan and UK are the major markets for fenugreek.

Celery : Annually, India produces 3,000 to 4,000 tonnes of celery and a major portion of it is exported. Export has increased from 3,089 tonnes valued at Rs. 37.34 million in 1989-90 to 3,525 tonnes valued at Rs. 58.13 million in 1993-94. USA, UK, France and Canada are the major markets for celery.

Saffron : Saffron, the costliest of all spices, is produced in Jammu & Kashmir State. Production during 1992-93 was 11 tonnes. Spain is the major producer of saffron. India exports small quantities of saffron to various countries.

Value-added spices : India has done well in the export of value-added spices compared to other producing countries. The important processed and value-added spices exported from India are spice oils and oeloresins, curry powder and ground spices. In addition to, de-hydrated green pepper, pepper in brine, freeze dried pepper and frozen pepper are also exported from India. Export earnings from these products have increased from Rs. 513.45 million in 1989-90 to Rs. 1,510.37 million in 1993-94.

Spice oils & oleoresins : India has a unique position in the export of spice oils and oleoresins. Export has shown an annual growth of 15 per cent in quantity and 41 per cent in value over the last five years. In absolute terms, export has increased from 717 tonnes valued at Rs. 228.58 million in 1989-90 to 1,270 tonnes valued at Rs. 692.11 million in 1993-94. The major markets for spice oils and oleoresins are USA, UK, Germany, France, Canada, Japan and South Korea.

Curry Powder : During 1993-94, India exported 3,650 tonnes of curry powder valued at Rs. 131.48 million as against 3,330 tonnes valued at Rs. 66.40 million in 1989-90. The value-wise growth recorded during the period was 20 per cent annum. The major markets for curry powder are UK, Belgium, Germany, Austrialia and a few countries in the Middle East.

FUTURE OUTLOOK

The future of spices export depends on three factors, namely availability, acceptability and affordability. In other words, India has to produce sufficient quantity of quality spices at competitive prices for export.

Value-added products especially spice oils and oleoresins have been identified as the extreme focus area in export. Other products in which special attention given are curry powder and paste, spice blends / mixes, spices in

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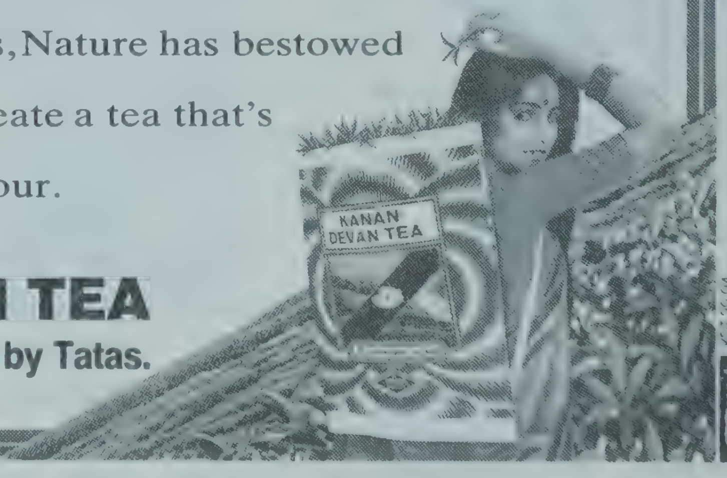


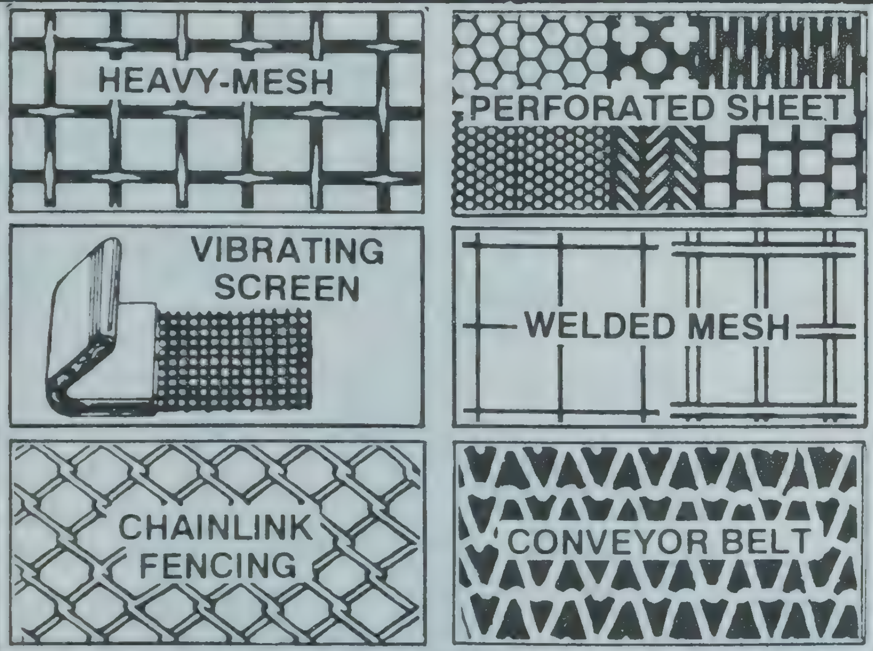
consumer packs etc. Schemes are implemented for the cultivation of non-traditional spices like vanilla, paprika and herbal spices. Expansion of area under cultivation of specific exportable varieties like Alleppey Finger Turmeric and Cochin Ginger which have high quality are also taken up. Organic cultivation of spices is another area where some efforts are made. Steps are also taken to develop/ commercialise new end products like micro-encapsulated spices and oils and oleoresins from fresh spices.

Quality is now the watch word in trade with developed countries. Various measures are taken to improve the quality of Indian spices. Training programmes are arranged to educate the farmers on better cultivation practices and on-farm processing. A series of training programmes are organised in the spice production centres. Cleaning/ processing/warehousing facilities at exporters level are established/ improved. Committed exporters with modern infrastructure for supplying quality spices are given Spice House Certificate. The Spices Board Logo is used on consumer packs to project Indianness and quality by selected exporters based on the fulfilment of stipulated conditions. Established exporters are encouraged to promote their brand in foreign markets through media programmes.

A laboratory for quality evaluation and upgradation has been set up at Cochin. Exporters are taking advantage of the laboratory for testing quality of spices. Financial and technical assistance is provided to exporters to set up inhouse quality labs and to procure sophisticated equipments for analysing pesticide residues in their own labs.

One of the problems India faces sometimes in the foreign markets is the price uncompetitiveness with countries. The low productivity, strong internal demand and high cost of production are the reasons for this. To increase productivity and to reduce cost of production, technological interventions such as hybridization and micropropagation are adopted. A number of varieties with high yield and good quality released from spice research stations are popularised alongwith improved farming practices. On-farm processing is improved by transferring modern methods to farmers. More units for the production of value-added items are set up for increasing their availability for exports.

— SPICE INDIA



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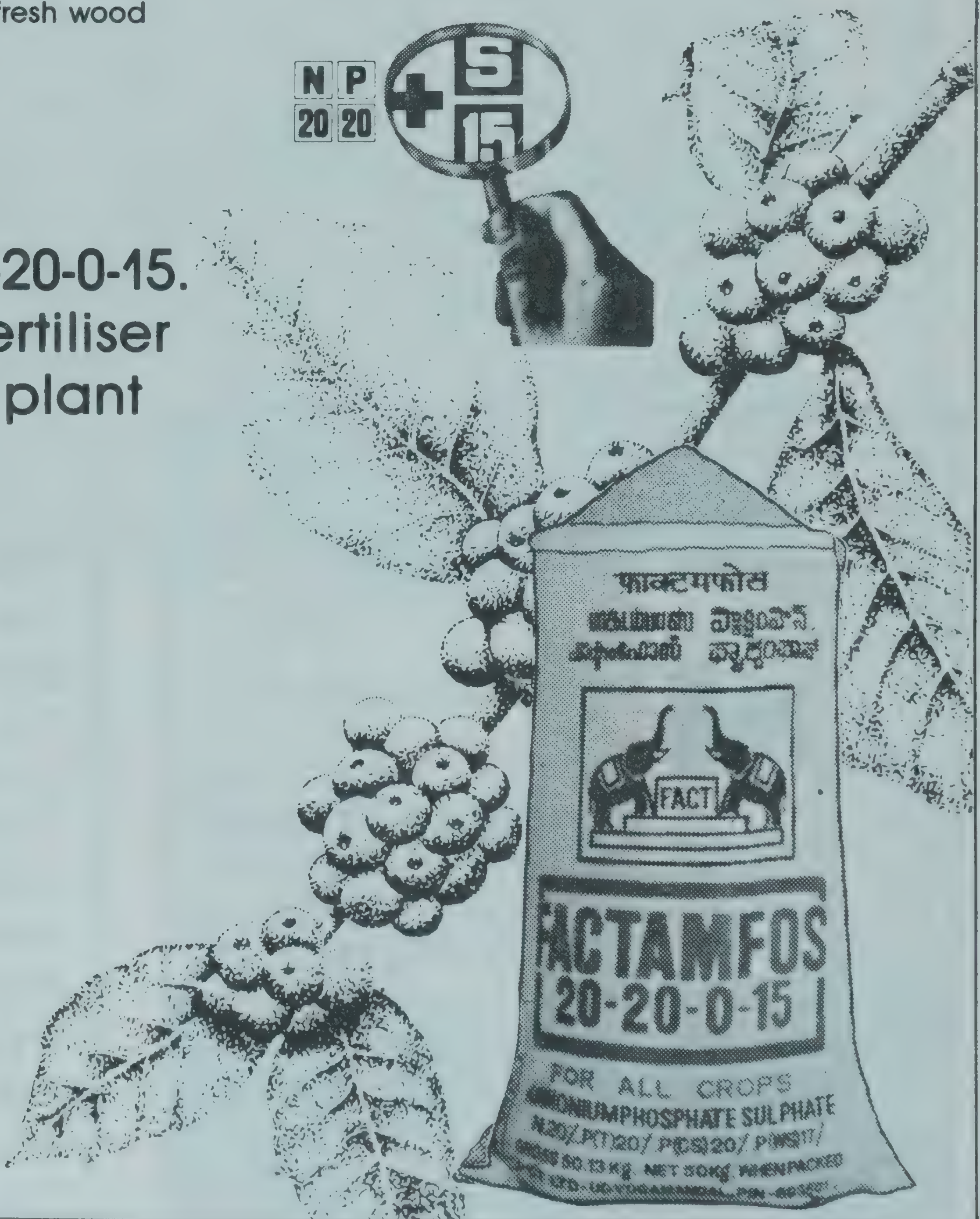

NR industry: Quality Assurance Imperative for Survival

C.M. GEORGE*

The increasing competition in internal and international markets for natural rubber makes it necessary to meet customers' requirements. In this context, the assurance of quality of NR produced in the country adopting IS/ISO quality management system becomes imperative.

The rubber industry in the country will undergo many major changes as a result of the liberalisation of economy and gradual globalisation of market. In the changing scenario, it is imperative for the industry to become competitive in the international market. This is possible only through quality improvement and consistency in quality. These are also essential for the survival of the industry.

What are the problems the rubber industry will face in the wake of globalisation of markets? All the protections, particularly a remunerative price, that the industry is enjoying will not be available. It is likely that the price movements and grades of NR in the country will hereafter be dictated mostly by the price movements of the same grades in the international markets. As there will be more import of NR and SR products there is bound to be tough internal competition. Unless there is more stress on consistency of quality there will not be any market for inferior products. Consumers will naturally demand more consistency, reliability and better standard of quality.

Export of NR grades and its products will also go up due to globalisation of market. It is to ensure that the growers are getting maximum price. Here again quality is an essential qualification for exporting products. The conventional system of marketing and packing is also ineffective and this has to be changed.

EXISTING PRACTICE

The existing practice of processing rubber into conventional forms will not help to achieve quality improvement because here emphasis is on inspection related activities where failures during processing will lead to segregation of products into different grades based on defects. Quality of any product cannot be achieved through inspection and grade alone. It has to be built into the product at every stage of processing of crop by adopting sound processing practices. The effort for quality improvement should start from the identification of customers' needs and then through various stages of processing which include procurement of inputs, processing, testing, etc. till the product is delivered to the customer. So what is required is a well defined system of quality assurance in NR processing and marketing system and that is lacking in the existing practice.

In the new situation it is not sufficient for Indian made rubber and products to be as good as that produced in Malaysia, Indonesia, Thailand etc. The Indian products should be better than that all the time. To enable the rubber industry to achieve better quality it is necessary and imperative that all the processing factories should adopt the quality assurance systemsuggested by the international Standards Organisation (ISO) in the processing and marketing activities.

GUIDELINES

The ISO has brought out a set of international standards of quality system called ISO-9000 series providing guidelines for formulating quality system suited to each industry. The

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* **Technical Consultant, Harrisons Malayalam Ltd., Kochi.**

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system will help identification of activities that directly affect quality and how such activities are carried out efficiently and economically. It also helps to evaluate the system itself meaningfully. A large number of ISO members 'including the Bureau of Indian Standards (BIS) have adopted these standards and formulated respective identical national standard. The BIS has brought out IS-14000 series identical to ISO-9000 series.

The IS-14000/ISO-9000 series of standards are meant to provide a frame work for and guidance on the selection of a quality management system for the operation of a supplier. These standards are on relationships between different quality concepts and they present three models for quality assurance systems. The standards advise suppliers and manufacturers what is required of a quality oriented system and identify the procedures and lay down criteria to ensure that the products meet the needs of the customers. They also force the supplier to write down what he is doing and bring the benefits of improved accountability, traceability, consistency and discipline of action.

MAIN FEATURES

The main features of the standards are the following :

IS - 14000 / ISO - 9000 provides guidelines for selection and use of standards on quality system. It explains fundamental quality concepts, defines key terms and provides guidance on selection and use. IS - 14001 / ISO - 9001 provides a model for quality assurance in design/development, production, installation and servicing. This is the most comprehensive standard covering all the elements of IS - 14002 / ISO - 9002 and IS - 14003 / ISO - 9003. IS - 14002 / ISO - 9002 provides a model for quality assurance in production and installation. It addresses the prevention, detection and correction of problems during production and installation.

IS - 14003 / ISO - 9003 provides a model for quality assurance in final inspection and test. This is the least comprehensive of the three models which addresses only requirements for the detection and control of problems during final inspection and testing.

IS - 14004 / ISO - 9004 — is the quality management and quality system elements guidelines. It provides guidance for a supplier in developing and implementing a quality system and in determining the extent to which each quality system element is applicable.

MOST APPROPRIATE

The standard IS - 14000 / ISO - 9000 quality system provides general guidelines for selection and use of the most appropriate model for a particular type of production / processing / manufacturing. The general selection criteria are design process complexity and maturity. Then the process complexity characteristics, safety and economics of the products.

The applicability of these selection rules, when examined against the nature and level requirements of natural rubber production processes, clearly indicate that adoption of the model IS - 14002 / ISO - 9002 may be the most appropriate for NR production, on account of the following reasons :

(1) The IS - 14001 / ISO - 9001 model entails design feature as well as formal producer-consumer interactions which are not generally required in NR production activities.

(2) The IS - 14003 / ISO - 9003 model is too restrictive as it centres only on inspection and testing of the products.

Though the system consists of 18 elements, the most important elements are management responsibility, contract review, quality in procurement, process control, quality documentation, control of non-conformity products, auditing the quality systems and training.

Management responsibility : It recognises the fact that the basic responsibility for quality lies with the management. It necessitates the management to state its vision through a quality policy consistent with its other objectives. This policy together with resources made available through men, materials and money will indicate the management's commitment to quality.

CONTRACT REVIEW

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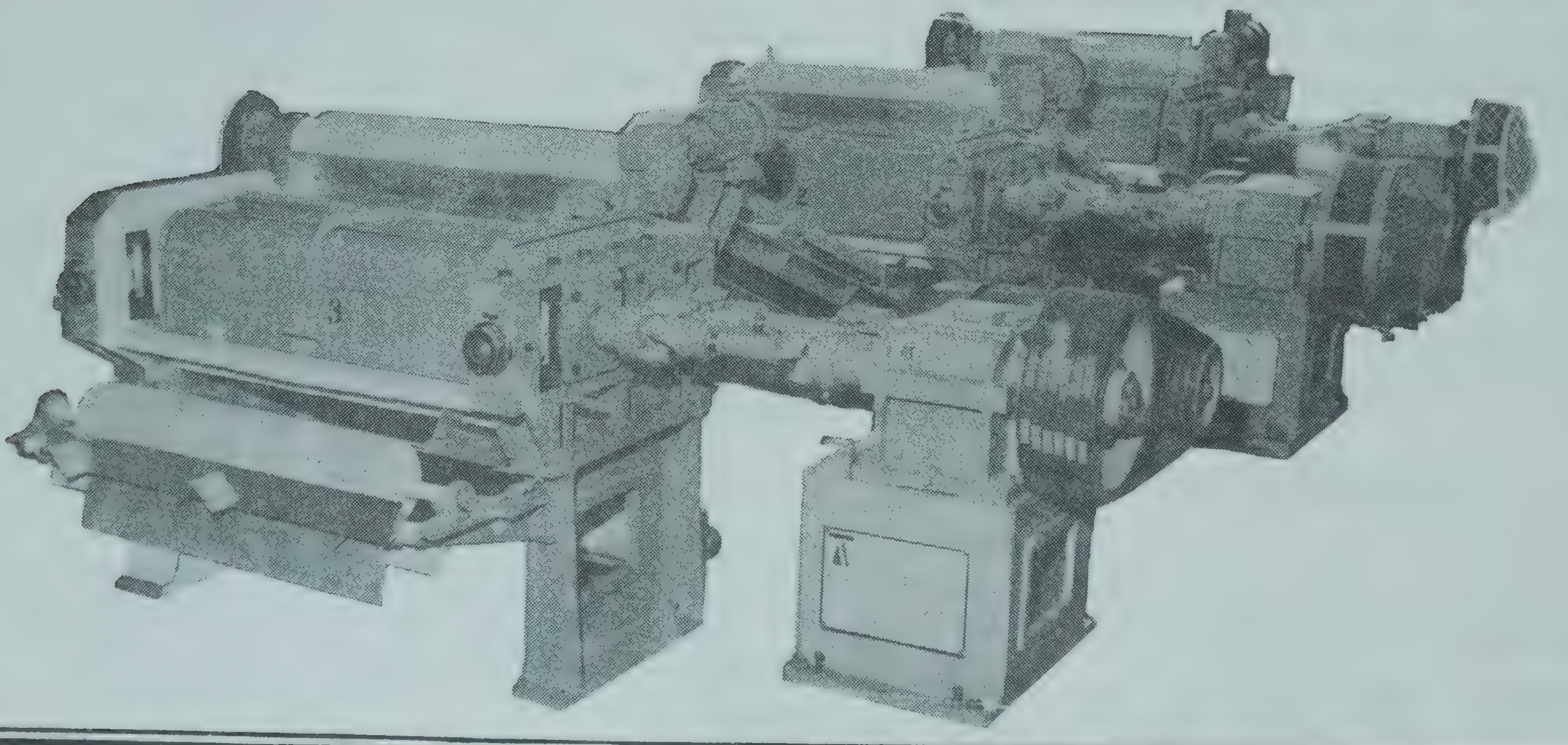

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unless it has been appropriately reviewed to determine that the requirements are understood and that the producer has the capability of fulfilling the customers, requirements.

Quality in procurement : There are NR producers whose business is only to collect crop from their own plantations and to process it in their own factory and even in such cases some chemicals will have to be purchased. There are also NR processors who buy even the basic raw materials for the production of rubber. In both cases, for the establishment and maintenance of an acceptable programme for quality management, it is not enough that a producer to control only the work done in his factory, there is also a need for controlling quality of the purchased materials.

Process Control : Process controls have to be planned and disciplined in order to be effective. The omission of any particular processing step from the scope of such control may result in unacceptable quality. Therefore, process control should cover aspects such as control of unit operations, inspections and testing.

Documentation and records : Documentation forms a major component in the adoption of the quality system. It includes not only those documents essential for purchasing, processing, inspection and testing, but also the written procedures that describe how each activity should be controlled. There should be a meaningful mechanism for approval and controlling of changes to such documentation.

Non-conformity products : In the production of different types of natural rubber some material not conforming to the standard will be found. There should be some methods to identify such non-conforming rubber and for its disposal.

Auditing the quality system : With a view to ensuring that the system remains effective, the management should periodically and systematically conduct review through an audit mechanism. Hence it is essential to plan and execute quality audits and verify periodically and record whether the quality activities comply with the planned arrangements.

Training : Provision of training to all the personnel connected with the production, based on an assessment of the training needs of individual personnel., should be a must in the successful adoption of the quality system.

Adoption of the system in an NR producing factory will demonstrate to the customers that the unit is committed to quality and is able to comply with their quality needs. The main advantage of getting registration for adoption of the system is that it will help to achieve and sustain the quality of the rubber, thereby improving the quality image of the NR produced in the unit. The other benefits are :

Improvement in the efficiency of the factory, more profit in the long run, achievement of professional development by training and motivation of the personnel, promotion of exportability of the products and international recognition of the ability of the unit to produce and supply quality products.

MAJOR PROBLEM

The rubber produced by different clones are not the same and hence it is rather difficult to ensure consistency of quality. So the adoption of a quality assurance system in the processing of the crop from rubber plantations is very necessary. The major problem of NR in general is the inconsistency in quality even within a lot, whether it is sheet rubber, crepe rubber, technically specified rubber or latex concentrates. The IS - 14002 / ISO - 9002 certification of the processing units in the country will definitely contribute towards the establishment of the consistency of NR.

The increasing competition both in the internal as well as the international markets for natural rubber, makes it necessary to meet customers' requirements and strict delivery schedules. In this context, the assurance of quality of NR produced in the country adopting the IS - 14002 / ISO - 9002 quality management system in the factories becomes imperative. Besides, optimum resource utilisation and the changes in NR markets and economics will also make the IS/ISO registration imperative for the NR processing units in the country.

— RUBBER ASIA

DISTRICT

What happened in the plantin

Districts	Weather	Rainfall	Crop (Compared to last year)	Pests and Diseases	Power Supply
Anamallais					
Central Travancore	Dry with Localised rains	Nil	Below normal	Thrips and mites	Adequate
Kanan Devan	Dry	Nil	Lower	Mites and thrips	Adequate
Kodagu	Bright	Slight in some parts	Lower	Berry Borer in Coffee and Quick wilt in Pepper	Inadequate
Malabar	Hot	13.2 mm.	Lower	OIDIUM	Inadequate
Mundakayam	Severe drought	480 mm.	Same	Nil	Inadequate
Nelliampathy	Dry. Cloudy since 24th Feb.	Nil	Lower	Purple/Pink Mite within limits	Inadequate
Nilgiris	Warm and Dry with scanty rains	11.1 mm.	Lower	—	Inadequate
Nilgiri - Wynaad	Dry	0.8 mm.	Same	Termite damage and Red-root disease	Adequate
Palani Hills					
Wynaad					

[* Feb. second week to Mar. first week]

EWS

istricts last month?*

abour ituation	Input availability	Meetings	Major events	Major issues
ormal	Normal	—	—	—
ormal	Normal	—	Finlay Shield Football Tournament	—
ormal	Normal	—	Mr. C.S. Malli, Addl. Secretary of Agrl. Ministery visited to study Berry Borer incidence	—
ormal	Poor	—	—	—
ormal	Normal	Nil	—	Estate properties such as security gate, calvert, rubber trees were damaged by miscreants from nearby villages
ormal	Normal	—	—	—
alm and Cordial	Normal	NPA Executive Committee Meeting on 11.3.95	—	—
ormal	Normal	Seventh Area Scientific Meeting of NWPA on 25.2.1995.	—	—

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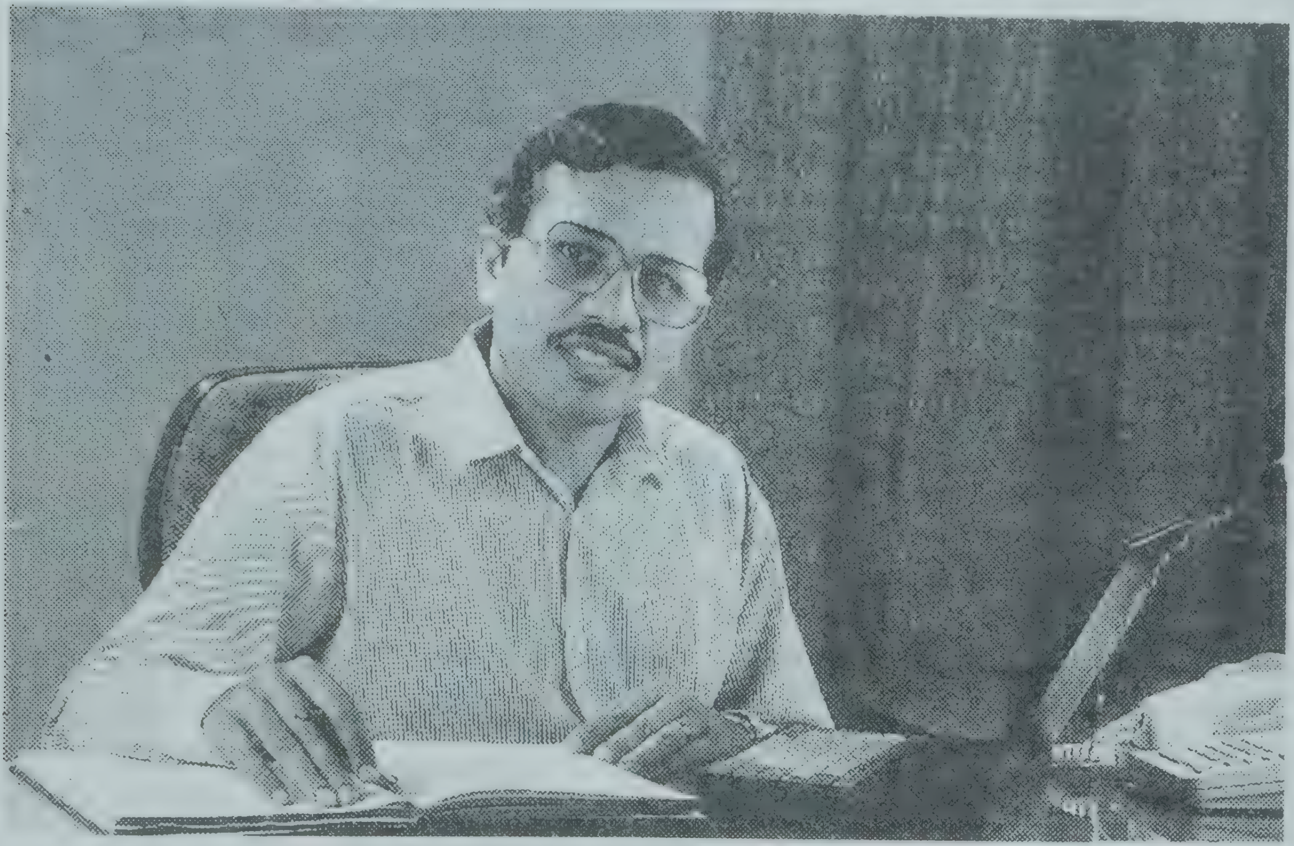

Mr. T. NANDAKUMAR, SPICES BOARD CHIEF

At this juncture of the current financial year, what is your overall view on spices exports till now in 1994-95?

Our exports have touched Rs 383 crores and we hope to reach the target of Rs 560 crores. Our normal average in February-March is about Rs 60 to 70 crores, so one should see that we hit our target.

Which spices performed at export levels that were poorer, when compared to the corresponding period of the previous financial year? What are be the reasons for their shortfall?

Spices exports during April-December 1992, estimated at 1.06 lakh tonnes valued at Rs 383.42 crores, show a decline of 19 per cent in quantity and six per cent in value when compared to last year. During the period, the export of cumin, fenugreek, other seeds, spice oils and oleoresins increased both in terms of quantity and value. Export of turmeric rose in terms of quantity while items like celery, fennel, other spices and mint oils went up in value terms.

Export of pepper came down to 23.850 tonnes, valued at Rs 138.61 crores from 38.856 tonnes worth Rs 145.03 crores, mainly due to the low production of 1993-94 and the negligible carry-over from the previous crop. However, due to the high unit value realisation, from Rs 37.32 per kg to Rs 58.12 per kg, the export value declined by only four per cent. The reported low production in major producing countries and resultant shortage in international supply has hiked both international and domestic pepper prices.

Turmeric had mixed fortunes with 19 per cent growth in quantity but 13 per cent decline in value. Export of chillies declined by 40 per cent in quantity and 34 per cent in value, mainly because of fewer imports by major buyers. Exports are expected to pick up in the coming months with demand from Sri Lanka.

Ginger export declined by 28 per cent in both quantity and value when compared to last year. The low production and high domestic price of exportable ginger was the main cause.

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However, the export achievement up to December 1994 was 64 per cent of the quantity target and 69 per cent of the value target set for 1994-95. Export of pepper was over 75 per cent of the target while that of cumin, fenugreek and other seeds exceeded the target on both counts. For December 1994 alone, the increase in value was by 36 per cent over levels achieved for that month, last financial — Rs 65.11 crores as against Rs 47.63 crores.

For those spices that did well, are prospects likely to be good for the rest of the financial year?

By and large, yes. I see good prospects even for chillies, but then that is likely to happen by March-April dividing the benefit between this financial and the next. Chilli export occurs during harvest season which should be in February for Andhra. So March-April-May would be peak export time.

Are you happy with productivity trends in various spices?

That is the only thing we are not happy with. Productivity is definitely low for most spices. But then one should also accept that at least some of these are inter-crops. So there is a little point in comparing productivity per hectare with Malaysia or Brazil where it is a pure plantation crop.

OBITUARY

Mr. R. WALKER CBE, OBE

Mr. Robert Walker CBE, OBE, former General Manager of the erstwhile Kanan Devan Hills Produce Company passed away in U.K. on 4th March, 1995.

`BOB' as he was fondly known to his many friends in the planting circles began his career as an Assistant Manager of Selaliparai estate in early 1924 when ``Opening up" was the order of the day and the Anamallai district in was a pioneering stage.

Mr. Walker was the UPASI President during the year 1949-50. Even after retirement, he was one of the regular contributors to the *Chronicle*.

Mr. D. SIVAPPA

Mr. D. Sivappa of Bettagere Estate, Suntikoppa P.O., Kodagu, died in Bangalore on 17th March, 1995 at the age of 73. Mr. Sivappa was the UPASI President during the year 1970-71.

There are of course advantages in inter-cropping, for it insulates the farmer against price fluctuations.

What I am not happy with is the productivity per vine (as in the case of pepper). This is largely a combination of factors — the planting material used, the incidence of disease and its management and the total agronomy practices. I think we need improvement in all three. This could be the right year for all that because of the high price.

Productivity is important from two points of view, it is not only to create surplus. The clear trend is that agricultural land is coming down and there are justified environment concerns which prevent the takeover of forest land to compensate. So only with right technology can higher productivity be achieved. Second, very often our cost of cultivation is high because of low productivity.

In an agricultural operation, except in harvest and post-harvest operations, the cost is not related to produce, but is per plant. For example, if you have to apply some manure to a pepper vine, then the labour cost is per plant, even the chemical limit is per plant. If you have better yield then

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you ae more competitive — ultimately, competition has to come from cost reduction.

Increased price is market-evolved but there again, consumer resistance could happen. So, a package has to be evolved by which even by maintaining price level, the farmer is assured of higher returns.

If we compare ourselves to any other intercropping spice-producing nation, then how well placed is our productivity?

Low. In perennial crops I think we have too many senile gardens and most of these have come up through unplanned cultivation. I don't think we focussed on what varieties to use and so on . . . at that particular time, our research facilities were fully involved in rice, wheat and other cereals, which was the need of the time. Now that we are self-sufficient in those areas. I think we could look at what sort of research should go into spices.

With reference to R & D in this field, are you content with the activity currently on?

No, at this point, we don't have anything to be satisfied about. Very little research has been done primarily due to the constraints on research agencies — they have too many things to do. Quantity wise, we need a quantum jump in R & D. Quality wise, we were mainly looking at productivity *per se.* But now we have to see what kind of yield we are getting. Like, are we losing the intrinsic quality — in Panniyur (pepper strain) we get the right yield but are we also getting the right *size* and colour? Another factor we have to see are the food safety concerns that would come up both in India and abroad — pesticide content, for example. If a strain is high-yielding but very susceptible to pests, we not only have problems with the end end-product but add on to costs through pesticide expense. The research agencies need to look at the market and the market should tell the agencies what they want.

At a time of funds constraints in the public sector, do you feel that there should be more of these R&D facilities coming up in the private sector?

Company R & D will come up. They have a definite role in product development because that has commercial bearing. So, whatever basic research the Central Food Technology and Research Institute or the Regional Research Laboratory would offer, there would still be a final upgrading of the product that private agencies can do. They would also be better at citing opportunities — like passing on a higher yielding strain. This kind of research can be taken up by the industry though I do not think that they can replace the others.

You think there is sufficient interaction between the industry and R & D institutions?

Not enough . . . in fact, we have been trying to create it. Recently, we had a meeting with the Horticulture Commissioner of India where we had called the Directors of horticulture, agriculture, some of the research agencies and couple of exporters, to look at four crops — pepper, ginger, turmeric and chillies. What we asked was, given the money what is it that can be done here?

What is the share of value-added exports in net exports? How would you assess the trade's response to value addition? Are we moving in tune with emergent trends in the international market?

In 1993-94, the estimated share of value-added exports was 14 per cent by way of quantity (23.736 MT) and 28 per cent in terms of value (Rs 151.04 crores). It has moved up from 10 per cent and 17 per cent in 1987-88. Oleoresins and good packaging are value-addition on predictable lines. They have been growing at a modest level.

Oleoresins . . . I don't think we can expect any major growth unless we get into primary products like vanilla or paprika. There is a limit to the oleoresin industry which is getting visible in the short run. In the long run they would have to upgrade to blends and sauces or the like.

However, where we feel more investment would come in, is sterilised ground products. To achieve it, we need technology that can upgrade raw produce to the finished product-selling a processed, ready-to-use bulk material. Then again, in developed countries, grinding is becoming costlier and they would want to shift it out to cheaper bases-bulk, ground products would be a kind of value-addition. As for trends, yes, we are moving in tune with international trends in value-addition but whether, we are moving fast enough is a different question.

Regarding oleoresins or sterilised ground products, do you think that our variety

of spices are conducive to yield such end products competitively?

Light pepper from Sri Lanka has definitely a higher oil content. Probably because they are harvesting it early, not necessarily a genetic advantage.Our farmers don't do so, because they think that the resultant weight loss is not compensated by price factor. Genetic factors are also possible and we have to look at that as a research priority.

But we should not look at importing raw materials from these countries as a negative phenomenon. If we do not import that raw material, somebody else is going to do that. May be Sri Lankans themselves would start making oleoresins. But if we import, then we would show that our process efficiency is offsetting others' production efficiency.

But then, how do we really compare in terms of process efficiency?

We are good. We have a range of spices that most countries don't have and the oleoresin industry is by and large successful because of the range they can make. Due to the range, our industry is also able to minimise idle time.

How has the acceptance of Spice House certificates in the international market been? How has the trade fared in maintenance of health standards in exports?

Acceptance of Spice House certificates has been satisfactory. The world food industry is primarily working on two concepts — ISO 9000 and HACCP. In both, there is one critical component — vendor assurance. Spice House is primarily concerned with the processing facility and the quality control laboratory. In 1994-95 exports, those with Spice House seem to have done better. Then again, from them, three have already got ISO 9000 certification.

As regards health standards, export rejects have definitely come down. These standards are changing. We have to keep pace — primarily looking at microbial contamination, aflotoxin and pesticide residue. The latter two would be the issues of the future.

Is the Board likely to be repositioned for there has been talk of declining Government assistance for commodity boards?

This Spices Board stands in a peculiar situation. If you look at the Tea Board or the Coffee Board, they are single commodity boards looking at everything about their commodity including export. MPEDA and APEDA are export development agencies. We are responsible for the entire work in cardamom and export development of other spices. So it is a problem in balancing your own resources.

The impression that you give as Spices Board is that you are in charge of development, which you are not. Very often, your own manpower management and focus of efforts gets diluted.

The emergent thinking is whether it would be better if cardamom research and development is part of the Ministry of Agriculture and Spices Board only looks at an export-focussed activity. There is a recommendation by a parliamentary committee to this effect which is being examined by the concerned ministries. I suppose they would want to consult on a larger scale.

— SHYAM G. MENON

— Excerpts from an interview which appeared in the Business Line.

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UPASI MEETINGS

- Trustees in Bangalore : 18th March 1995.
- Executive Committee in Coonoor : 25th March 1995.
- Budget General Meeting in Coonoor : 25th March 1995, at which the revised budget for 1994-95, budget estimates for 1995-96 and the subscription rates for 1995-96 were approved. The proposal to levy a special subscription as also amend the bye-laws to empower the Executive Committee to waive the subscription in special circumstances were also approved by the General Body.

UNION AND STATE BUDGETS

So far as plantation sector is concerned, the main change in the Union Budget is that it has been proposed to change the definition of plant for depreciation purposes thereby excluding tea bushes from the purview of 'plant' retrospectively from 1962. Representation is being made for the restoration of the earlier facility of providing depreciation for tea bushes.

In relation to the Southern State Budgets which have also been presented, the following are the salient features :

Tamil Nadu

- A provision relating to Plantation Development Fund has been introduced under the Tamil Nadu Agricultural Income Tax Act, providing tax deduction upto 8 per cent of the Agricultural Income liable to tax, if the amount is deposited with NABARD, Commercial Banks or State Co-operative Banks and is utilised for specified purposes like replantation, extension planting, purchase of machinery, construction of factories and godowns etc.

Kerala

- Sales Tax on coffee and cardamom has been reduced to 4 per cent.
- Exemption limit for levying Agricultural Income Tax Act has been raised from Rs. 28,000 to Rs. 40,000.
- Compounding tax rates for coffee, rubber and cardamon have been revised; details are awaited.
- Value added tax has been extended to foam rubber and Synthetic rubber foam.

Karnataka

- Sales tax on coffee seeds (raw or roasted) has been increased to 6 per cent from 5 per cent.
- Point of levy of sales tax has been shifted from first sale to first purchase in respect of the Coffee Board and coffee curing works.
- With a view to preventing unauthorised movement of coffee it has been proposed to have inter-state coffee movement on permits to be issued by the Department of Commercial Taxes.
- Last year, coffee companies were treated as dealers and this has now been extended this year to partnership firms who own coffee estates.
- For modernising and upgrading the operations of the coffee industry, an Investment Deposit Scheme has been announced under the State Agricultural Income Tax Act arising from which pre tax profits can be usefully invested for enhancing the productivity of coffee growing areas. A deduction of 5 per cent of total agricultural income will be allowed, if such amount is invested in the Investment Deposit Scheme and is used for specified purposes.
- The holding limit for agricultural income tax under the Composition Scheme has been reduced from 15 acres to 10 acres and the revised rates are :

Extent of land	Proposed rate of tax per acre (Rs.)
0 — 10 acres	Nil
11 — 15 acres	750
16 — 20 acres	1,000
21 — 25 acres	1,250
26 — 30 acres	1,650
31 — 40 acres	2,000
41 — 50 acres	2,500

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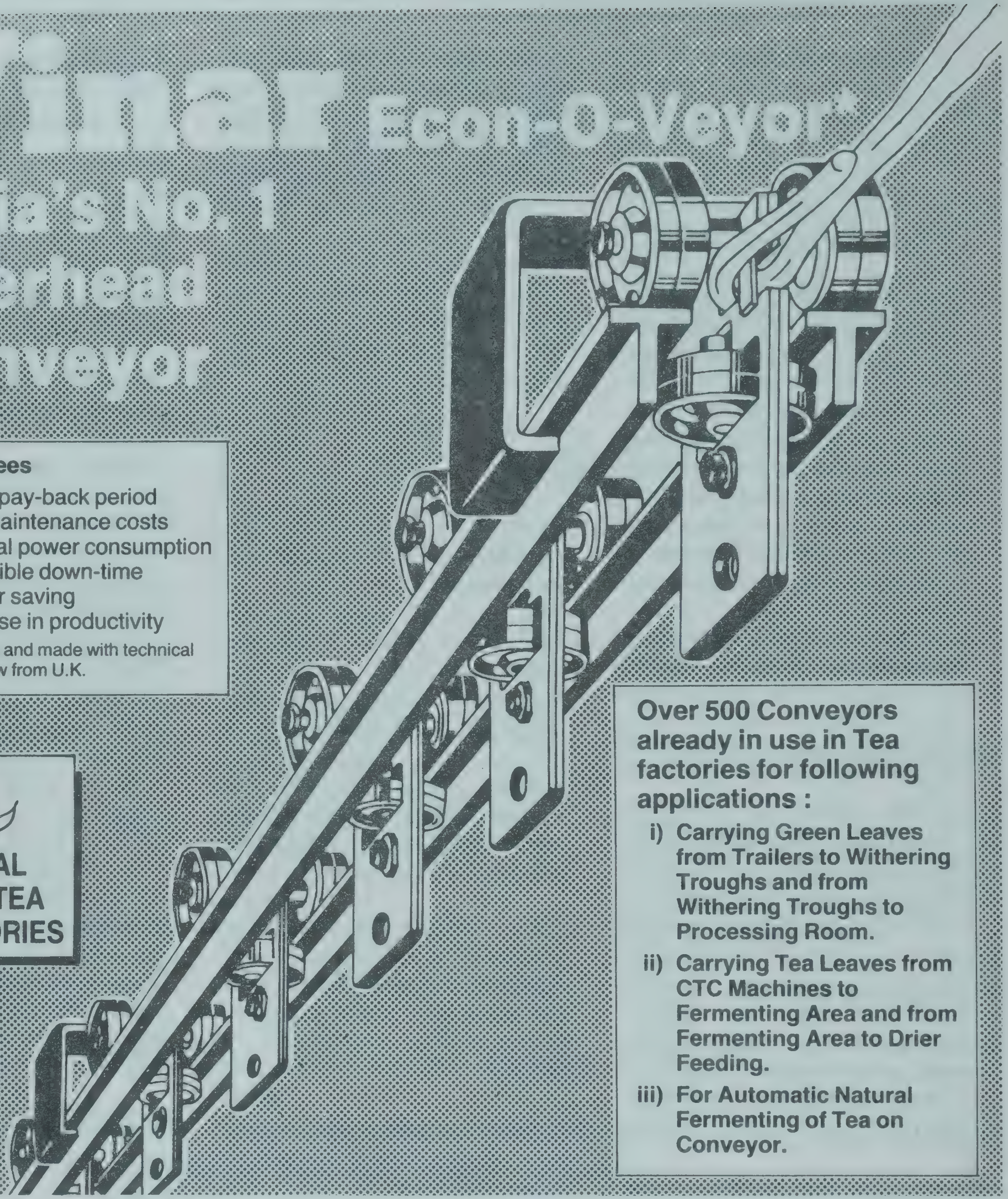

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CORE COMMITTEE ON TEA

The meeting of the Core Committee on Tea was held in Delhi on 23rd March 1995. It was chaired by Mr. Tejendra Khanna, Commerce Secretary. The Director, Ministry of Commerce, Chairman, Tea Board and the Chief Regional Executive, Tea Board, Coonoor were among the officials present. The submissions on behalf of the industry were made by the UPASI President and representatives from Tea Associations in North India.

The industry reiterated its earlier submissions that the provisions relating to compulsory sale through auctions under the Tea (Marketing) Control Order, Tea Waste (Control) Order, Tea Warehouses (Licensing) Order and the Tea (Distribution & Export) Control Order be repealed. The need for deleting the requirement of taking shipment licences from Tea Board for every consignment exported was also stressed. From the Government side, it was sought to retain the controls from the view point of transparency in sales, control over exports and exporters, ensuring proper storage, check on quality of tea, checking adulteration of tea etc.

At the end of the discussions, it appeared as :

— While the provision relating to compulsory sale through auction under the Tea (Marketing) Control Order is not likely to be completely withdrawn for the present, the percentage could be reduced from the existing level of 75 per cent.

— Tea Waste (Control) Order would remain, but a lot of procedural simplifications will be evolved.

— The Tea Warehouses (Licensing) Order would continue.

— The Tea (Distribution & Export) Control Order would also remain.

— Exporters having a turnover of Rs. 10 crores have already been exempted from the requirement of obtaining shipment licence for every consignment. Arising from the discussion, the requirement is likely to be done away with in respect of exporters registered under the Tea (Distribution & Export) Control Order and whose track record during the course of the last three years has no blemishes. Virtually, only new comers to the tea export business may be required to go through the drill of taking shipment licences.

Industry's proposals to have a smaller Board for effective functioning will be taken up at the next meeting. Yet another issue that will be discussed is the procedure of collection of cess under the Tea Act.

TEA BOARD'S TEA MACHINERY & IRRIGATION EQUIPMENT SCHEME

The Government of India has accepted the request of the tea industry for converting the above scheme from that of a hire purchase scheme to that of a loan scheme. When it was on hire-purchase basis, the tea units who availed the facility had to pay sales tax twice : first, when the machinery was supplied initially and again second time after 10 years when the ownership of the machinery was transferred from Tea Board to the tea unit after the full payment of value of the machinery along with interest to the Board. Ironically, the sales tax second time had to be paid on the original value of the machinery and not on the depreciated value. Now that it has been converted into a loan scheme, instead of supplying the machinery, the Tea Board will only provide the loan directly to the tea unit so that sales tax is required to be paid only once. The amended scheme will be effective from 1st April 1995. The details of the scheme are awaited.

The request of the tea industry for enhancing the loan amount under the scheme from the present Rs. 15 lakhs to Rs. 25 lakhs is, however, still pending with the Commerce Ministry.

COFFEE ACT

The Commerce Ministry has called for industry's views on the need

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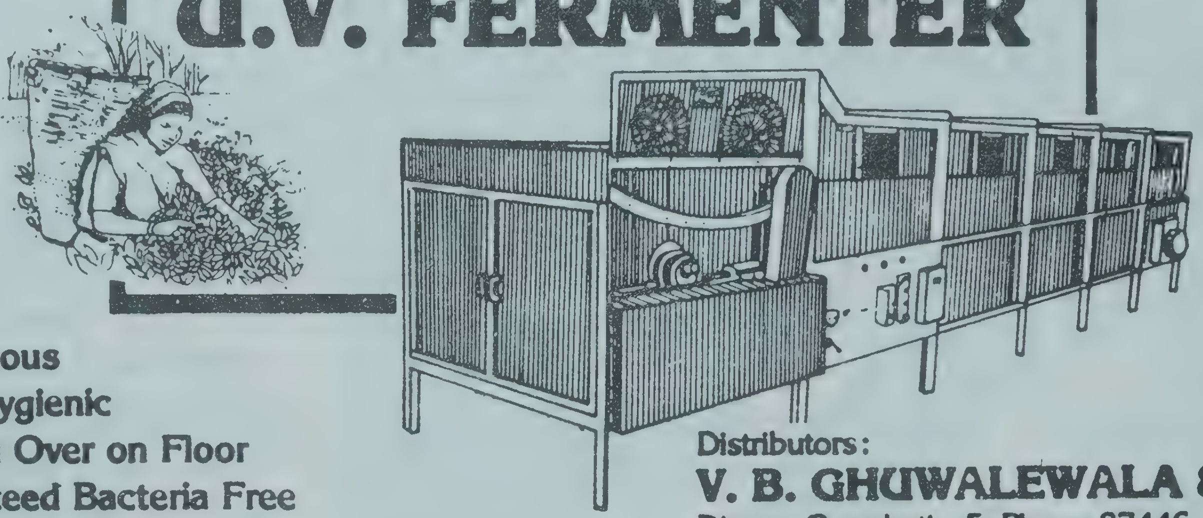

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for amending various provisions of the Coffee Act taking into account the changes that have taken place over the years and the present scenario. The UPASI Coffee Committee has formed a Working Group to consider the proposals. The Working Group has met already and the proposals will be finalised shortly. This will then be submitted to the Coffee Board at the first instance and then would come up before the Core Committee on Coffee.

CARDAMOM REPLANTING SCHEME

The Spices Board offers a replanting subsidy of Rs. 8,000/- per hectare for growers owning upto 5 hectares. It is payable in three instalments @ Rs. 4,500/-, Rs. 2,000/- and Rs. 1,500/- during first, second and third year respectively. Those desirous of availing the facility may submit their applications in the prescribed form to the Field Offices of the Board before 30th April 1995; the forms could be obtained from the nearest field office.

TEA PACKAGING

The Tea Trade Association of Cochin as also that of Coonoor have decided to permit use of P.P. Woven sacks at auctions as a substitute for polythene lined gunny bags on a trial basis with the following specifications :

FABRIC : High density polyethiliene or polypropeliene manufactured from virgin food grade granules

MESH : 12 Mesh x 12 Mesh

DENIER : 1000 (Thickness of tape)

STITCHING : The bottom to be stitched with polypropeliene thread

WEIGHT : The weight of the bag without the inner liner 170 - 180 gms

LUGS : Two 20 cm handles on opposite base corners of the sacks

DIMENSIONS

LENGTH : 85 cm

WIDTH : 53 cm

GUSSET : 25.5 cm

WOMEN IN AGRICULTURE DAY

The UPASI-Krishi Vigyan Kendra celebrated the 'Women in Agriculture Day' on 31st January. One hundred and thirty farm women inclusive of seventy tribal women, from the villages adopted under lab-to-land programme, Tribal Area Research Project, Farm Science Clubs and other Rural Development Project areas participated in the programme. They have been trained in the areas of V.P. tea nursery techniques, propagation of ornamental plants, nutrition and balanced diet, fruit and vegetable preservation, energy saving devices, woollen knitting, tea plucking, energy saving devices, woollen knitting, tea, plucking, cultivation of herbal spices, marigold and tea processing.

VISITS

A team consisting of twelve officers of small Tea Holdings Development Authority, Sri Lanka, visited UPASI between, 5th and 12th February under the sponsorship of Asian Development Bank for the promotion of small tea garden development. The programme was inaugurated by Dr. B.S. Hansra, Assistant Director General (Extension), ICAR, New Delhi. The delegates were taken around various UPASI-Tea Board Development project areas and the Nilgiris estates.

Mr. A.S. Sharov, a Russian Cameraman and Film Director, who was awarded best still photographer by Tea Board of India, visited UPASI-KVK, Small Tea Gardens and Tea Factory on 16th and 17th March in the Nilgiris.

PRICE TREND (Rs./Kg.)

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COCHIN	36.98	44.57	32.49	37.27	33.10	31.37
COIMBATORE	34.56	42.20	27.99	35.77	28.85	28.58
COONOOR	34.06	33.68	25.93	29.99	27.75	31.81
AVERAGE	35.45	41.91	28.98	35.31	30.35	30.67
COFFEE						
a) **Private Auction**						
PLANT - A	126.00		148.83		47.51	
ARA. CHY. AB	106.00		138.87		42.79	
ROB. CHY. AB	94.17		122.96		35.76	
b) **Coffee Board Auction**						
PLANT - A	98.40		126.60		49.23	
ARA. CHY. AB	96.84		118.06		42.88	
ROB. CHY. AB	92.16		106.10		37.33	
RUBBER						
a) **Kottayam**						
RSS LOT	54.40		35.75		25.25	
RSS IV	55.00		40.50		26.25	
b) **Kuala Lumpur**						
RSS I	56.97		39.83		28.95	
SPICES						
CARDAMOM	239.55		303.77		337.58	
PEPPER	74.75		73.50		50.50	
CLOVES	85.00		90.00		85.00	
NUTMEG	100.00		80.00		92.50	

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1995	:	9,978
1994	:	14,593
1993	:	8,545
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1995	:	20,914
1994	:	28,134
1993	:	18,489

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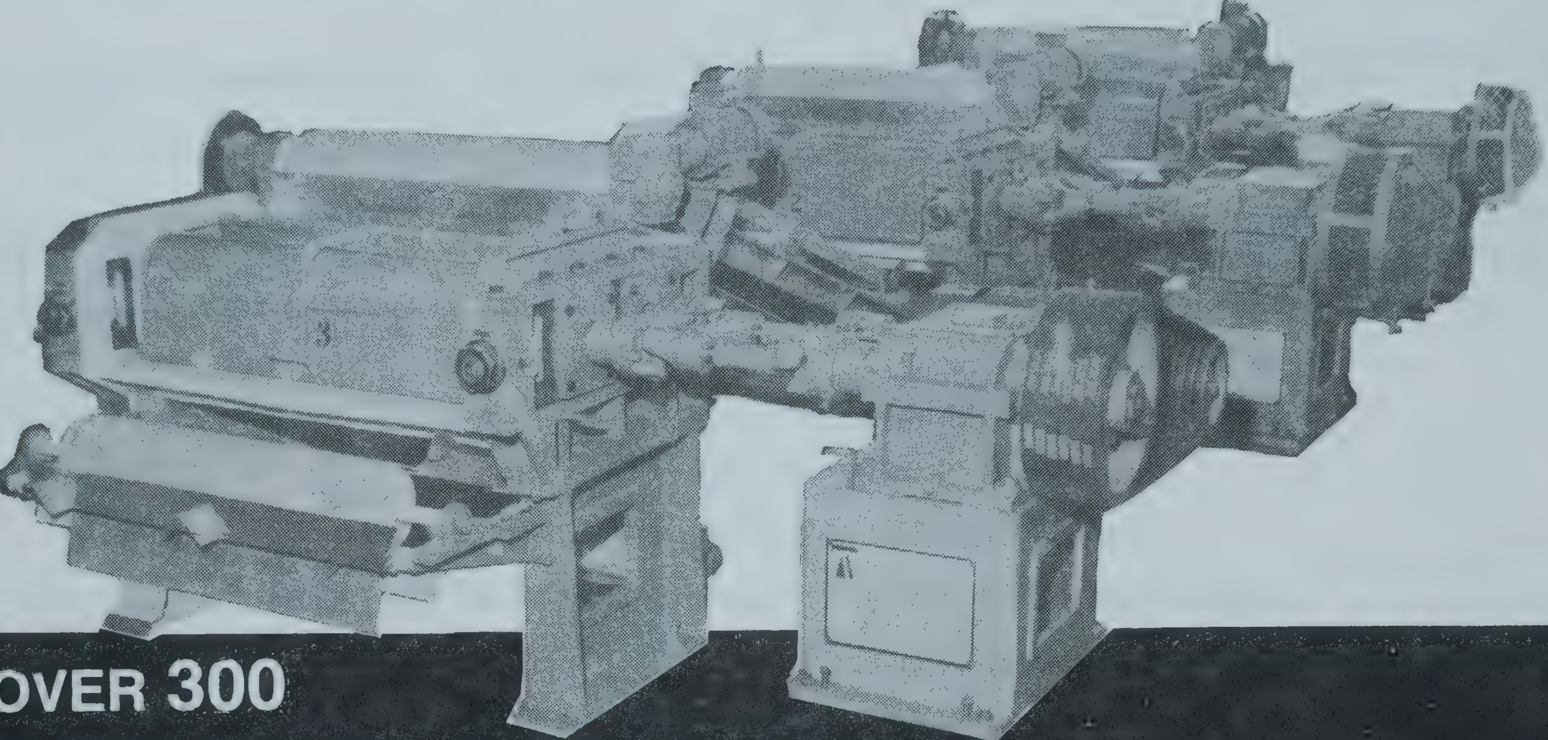

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SOCIAL RESPONSIBILITIES OF BUSINESS

There is considerable Government will, both at the Centre and in the State, to help those long neglected small growers, particularly tribal people, in educating them to improve their method of cultivation of agricultural crops and also provide them with the skills for earning livelihood. But it needs the knowledge and sensitivity of grass-root social service organisations which have experienced and qualified people to translate the intention of the Government in practical application.

The birth of Krishi Vigyan Kendras (KVKs) occurred with the above consideration. The green revolution in Punjab had clearly showed that Indian farmers have the ability to adapt to improved methods of cultivation. What is required is to transmit this knowledge to them in a convincing manner. For convincing them, there must be trust; trust of the farmers on those who communicate. Communicaters who have conviction in what they are doing. They must have the ability to talk in the language of the farmers. They must mingle with them. They must be accepted by the farmers. This is important because farmers everywhere view outsiders with suspicion.

In the case of tribals the task of social organisations is more difficult because basically the tribals don't want to change. They don't want to take to new avocations. In a manner of speaking, they are content with their present way of living. They look at askance at the city people. To most tribals formal education is anathema. The tribal chief has the final say in what the tribals should do.

To break the barrier and to convince such people on the benefits of self-employment, rearing cattle, bee-keeping, fruit growing, and a host of other activities is no easy job.

``Lab-to-land'' is very easy to say; translating the same in practical terms is not so easy. It is here that the KVKs come into the picture.

UPASI-KVK set up in 1982 has done yeomen service to the tribals and small growers. Statistics of what have been achieved are given elsewhere in this issue. But statistics don't always convey on a matter like this what has been achieved. The credibility created, the keenness with which tribals and farmers look for the visits of KVK social reformers, the gleam in the eyes of the tribals who have achieved professional skills or good production of agricultural crops or plantation crops can't be measured in numbers or kilos. What is achieved by one group is transmitted to another *group* by spoken words.

The pace may be slow, but it is the step in the right direction. These small people look at the UPASI-KVK as a friend, guide and philosopher. They are at home at the UPASI-KVK which they are not in when they go to Government offices. It is this trust which enables UPASI-KVK to transcend the barriers on communication and reach the small people.

Should commodity associations like UPASI involve in social activities? A question often posed by planters. The context is UPASI-KVK. There are a few who feel it is not the business of commodity associations to involve in such activities. There are some others who look at it as PR exercise. There is a small group which feels that each business has an obligation to do good for the society, apart from the business in which it is involved. Unfortunately, this is a minority group. Not here only; everywhere in the country.

The apex chambers of commerce and many of the leading businessmen are convinced that business doesn't mean only business. Business has to be part of the main stream. It has to be part of the *milieu.* This is not for kudos; it is the obligation.

In what form the obligation should be transformed would depend upon the circumstances, the limitations of the business and the aspirations of those around the business.

UPASI received the FICCI award for rural development in 1979.

According to ICAR, UPASI-KVK is one of the best managed Kendras. Those who visit UPASI-KVK, many from foreign institutions, are impressed with the good work that is being done. Yet, these certificates should not be taken as the yardstick to assess achievements of UPASI-KVK. The true yardstick is the acceptance level of tribals and small farmers for whose benefit KVK programmes are launched. That speaks volumes. The effect and the extent they look upon UPASI-KVK for guidance on all matters are the certificates.

The demonstration plots run by UPASI-KVK are an eye-opener for neighbouring farmers. Through the demonstration plots, the message that better yield can be obtained is spread.

The officers of UPASI-KVK are the agents of change. Often a group may consist of 10 or 15 people. In terms of statistics this is very low. But these 15 people become agents of change in due course. That is why the achievements can't be measured in terms of numbers.

Fast changes are taking place in agriculture, floriculture, infilling, medicinal plants, multicropping — many more. Cultivation by common sense, though still has some value, can't cope with these changes. The approach has to be scientific.

Who can reach the small growers and tribals in far out places with this scientific knowledge? No doubt the social reformers in the KVKs.

And that is the *raison d'etre* for UPASI-KVK. ✪

UPASI-KVK

— An Overview —

By

A. RAMESH RAO
PRESIDENT, UPASI

At the Annual General Meeting of the Associated Chambers of Commerce & Industry of India held last year the Prime Minister observed :

> "Much remains to be done in the areas, such as, health, promotion of women welfare, problem of mass literacy, child care and the like. The corporate sector must assume much greater social responsibility than they have done in the past".

South Indian planting sector has been involved in various social welfare activities from time immemorial. Efforts of individual planters in this area had won kudos.

Over two decades back, the planting community felt that over and above the efforts of individual companies, UPASI as an organisation should involve in rural development activities. The planting community can take pride in the fact that in 1979 FICCI gave due recognition to UPASI by giving the award for rural development.

Some time in 1981, UPASI felt that in furtherence to the role it has been playing as a catelytic agent in rural development, the Central Government should be approached for setting up a Krishi Vigyan Kendra under the aegis of UPASI. The response of Indian Council of Agricultural Research to the request of UPASI was prompt and positive. UPASI-KVK was born in September 1982.

At this juncture, a brief mention of UPASI is relevant.

The United Planters' Association of Southern India symbolises the organised status of the farming community engaged in producing tea, coffee, rubber and cardamom. Founded in 1893, it is the apex body of the growers of these crops in the South. In its primary role, the UPASI represents the growers' interests in national and international forums and apart from the representative function, it is engaged among others in scientific research, economic research, statistical analysis, commodity affairs, industrial relations, estate supplies, taxation and finance, land and legal issues, publications, public relations and communications, conferences, seminars, workshops and rural development.

The Association places prime significance on Research and Development. The salient features of this effort include the running of a well established tea research institute and eight advisory centres for transfer of technology.

The UPASI Krishi Vigyan Kendra has completed a decade of its existence and has served farm men, farm women, youth and tribals in all parts of the Nilgiri district.

The various activities of the Kendra include :

- Training on agriculture and allied activities
- Demonstrations
- Supply of high yielding planting materials
- Crop Diversification Scheme
- Lab-to-Land programme
- SC/ST programme
- National Demonstration
- Tea clonal nurseries
- Field advisory visits
- Mass media programmes
- Publications
- Motivation through awards
- Women in agriculture day
- Farm Science clubs and Mahila Mandal
- Impact studies.

The KVK has become a very important link between the farming community on one hand and scientists, extension workers and developmental departments on the other.

The UPASI-KVK is the first of its kind to promote the plantation crops specific to remote hilly areas of the Nilgiris. Since the major cultivated area (60 per cent) in the Nilgiris is devoted to tea cultivation, the mandate of KVK has been the tea based cropping system.

Major activities undertaken by UPASI-KVK :

(i) **Training :**

Lack of knowledge on technical know-how is one of the limiting factors for increasing productivity. In order to overcome this, need based production and practical oriented training programmes are organised at the training centre, various villages and Industrial Co-operative (INDCO) tea factories. The duration of the programmes varies from one day to one year. These courses include training on tea, coffee and spices cultivation, horticulture, agricultural engineering, home science, live-stock production, bee-keeping, mushroom cultivation and sericulture. The beneficiaries are small farmers, members of INDCO factories, estate personnel, grass root level extension workers, unemployed youth and rural women.

An instructional farm with an area of 16.16 hectares located at Glysdale, Coonoor, is used for imparting practical training on tea cultivation, horticulture, sericulture, bee-keeping, etc. to the trainees and also disseminating the largest technical know-how.

(ii) **Demonstrations :**

The demonstration plots are laid out in farmers' fields. The main objective of conducting demonstrations is to create interest in scientific cultural practices as "seeing-is-believing and learning-by-doing". In these plots, all the cultural operations are carried out under the direct supervision of technical personnel by supplying all the essential inputs, free of charge.

(iii) **Supply of planting material :**

Availability of suitable planting material is one of the constraints faced by the growers, who are otherwise convinced about the importance of undertaking infilling of vacancies in their fields. High yielding tea clonal plants are raised at the Kendra and supplied to the farmers at a subsidised cost with the assistance from the Tea Board.

(iv) **Crop Diversification :**

Even though, tea and Nilgiris are made for each other, vegetables occupy the second position in the cropping pattern of the district. Among the various annuals, potato is the major crop. Indiscriminate land use and frequent tilling of the soil in the undulating terrain, have led to enormous soil erosion, land slides etc. The repeated failure of the potato crop due to erratic monsoon, pest and disease problems, spiralling cost of labour and inputs leading to uneconomic returns have forced the farmers in the marginal rainfall areas, to keep their land fallow.

At this juncture, the novel idea of crop diversification was introduced, aiming at preserving the ecology of the district and providing an assured income to the farmers.

The objective of the scheme was to demonstrate the proper method

TRAINING ACHIEVEMENT 1983-84 — 1993-94

Sl. No.	Practising farmers and youth		Extension functionaries	
	C	P	C	P
1. Crop Production :				
a) Tea	1271	16698	135	4023
b) Coffee	97	2211	-	-
c) Spices	54	1123	-	-
2. Horticulture	85	1761	1	8
3. Livestock	38	875	-	-
4. Home Science	303	5719	33	1121
5. Agrl. Engineering	244	5653	13	362
6. Agro Forestry	5	83	-	-
7. Sericulture	60	1090	-	-
8. Mushroom cultivation	61	1322	-	-
9. Bee-keeping	56	1227	-	-
10. Rabbit rearing	2	39	-	-
11. Carpet weaving	4	102	-	-
12. Blacksmithy	1	4	-	-
13. Pottery	1	10	-	-
	2282	37917	182	5514

C - Course
P - Participants

of planting tea with adequate soil and water conservation measures in the non-traditional tea areas.

(v) **Tea clonal nurseries :**

The massive tea planting programme under crop diversification has created a sudden spurt in demand for tea planting material. To cope with this, the areas suitable for raising tea nurseries were identified and the educated unemployed youth from these areas were motivated to take up tea nursery as a commercial venture. They were trained in tea clonal nursery management and helped in getting bank loans. There are more than 500 tea clonal nurseries propagating around 35 million plants, annually.

(vi) **Field visits :**

Periodical field advisory visits are undertaken to the small tea gardens by the technical personnel of the Kendra. This ensures a good rapport between the KVK and the small tea growers, besides solving their day to day problems in implementing scientific crop husbandry techniques, taught to them during the training and suggestions for improving the yield are given on the spot. A report containing the recommendations made to them is also sent, subsequently for reference.

(vii) **Soil analysis :**

Soil samples received from the farmers are analysed at a nominal charge. Based on the results, advice is given on the suitability of the soil for use in tea nurseries, planting tea, amending soil pH by application of dolomite prior to pruning and use of minimum quantity of fertiliser to be applied taking into account the yield, soil nutrient status and jat of tea.

(viii) **Farm Science Clubs :**

Nine Farm Science Clubs have been established in the villages to act as liaison between the KVK and the local community, to create awareness on scientific crop husbandry practices, to facilitate interaction among members of the different clubs, to organise discussions on various cultural aspects and to organise study tours.

(ix) **Mass media programmes :**

All the training programmes organised by the Kendra are announced by All India Radio, periodically. This is very helpful in getting adequate number of trainees for the programmes. Periodical talks pertaining to the seasonal operations are delivered by the subject matter specialists over All India Radio and Doordarshan for dissemination of information. Whenever there is any outbreak of pests and diseases, symptoms of damage along with the control measures to be adopted are announced over radio to overcome the timelag leading to crop loss.

(x) **Publications :**

Publications on tea cultivation, horticulture, home science and agricultural engineering are brought out by the Kendra, which serve as course material for the trainees, besides use as a ready reckoner to the planters, farmers and students.

A bi-monthly Newsletter covering weather and crop production for the preceding two months, calendar of operations for the subsequent couple of months, highlights of the activities of the Kendra, question and answers, schedule of the training programme for the next two months are sent to the extension agencies, farm science clubs and selected farmers.

(xi) **Award to outstanding small tea gardens :**

In order to motivate, recognise and reward the progressive farmers, the Kendra is awarding prizes, every year to the farmers who adopt scientific cultural practices systematically and harvest high yields in the district.

(xii) **Lab-to-Land Programme :**

The ICAR sanctioned the Lab-to-Land Programme to the UPASI-KVK in 1984. This project is meant to improve the overall economic conditions of the adopted farm families by not only increasing the productivity of their farms but also by creation of additional employment through diversification of enterprises. This project is also meant to create an awareness among the weaker sections of the society for proper utilisation of benefits available under different developmental programmes.

There are six primitive tribes in the Nilgiris and these hill tribes are isolated by ecology, demography, economics and politics from other ethnic groups. Even though there are many extension agencies working in the district, the penetration of extension programmes to the tribal areas is negligible.

On priority, the tribal holdings which were lying fallow for many years are developed by introducing various plantation crops like tea, coffee, spices and mulberry, income generating activities like apiculture, rabbit rearing, tailoring and mushroom

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cultivation were also introduced for the benefit of landless agricultural labourers.

(xiii) **Women in Agriculture Day :**

The Kendra is celebrating Women in Agriculture Day on 4th December, every year, from 1989, in which the vital role of women in the development of farm and home are highlighted. Farm women from the tribal villages, farm science clubs, women's clubs and other local villages participate in the function. They are taken round the various demonstration units of the Kendra and explained about different aspects like nutrition garden, improved chulas, wool knitting, carpet weaving, clonal nurseries, mushroom cultivation, bee keeping, etc. Films on environmental protection, improved chulas and video cassette on tea harvesting are screened. Meetings are also arranged by inviting important dignitaries in the district to address the farm women.

(xiv) **Women's Club :**

Seven women's clubs have been organised in the villages to create awareness among the rural women on nutrition, child care, health and hygiene, energy saving devices, kitchen garden and income generating activities like tailoring, knitting and bee keeping. Regular training programmes were arranged on the above aspects. Three tailoring units have been established in the tribal villages in collaboration with Indian National Trust for Art and Cultural Heritage (INTACH), Nilgiri Branch.

(xv) **Linkages :**

A good rapport has been established with several institutions with the object of achieving desired results in a relatively shorter period of time by pooling the technical information, resources and manpower besides the farmers having exposure / access to the various institutions.

(xvi) **Impact studies :**

The Kendra has been carrying out periodical studies on the impact of the various programmes implemented. Some papers published on the following topics :

(a) Impact of the Farm Radio School on the small tea gardens in the Nilgiris.

(b) Impact of the training programmes on v.p. tea nursery management in the Nilgiris.

(c) Upliftment of tribal families in the Nilgiris through Lab-to-Land Programme.

(d) Impact of Crop Diversification in the Nilgiris.

(xvii) **Other activities :**

(a) **Carpet weaving :** A carpet weaving training centre was established at the KVK Instructional Farm in collaboration with the Department of Handicrafts, Ministry of Textiles, Government of India, in June, 1990 for imparting training on carpet weaving to the rural women.

(b) **TRYSEM programme :** Since 1988, the Kendra has organised three training programmes of six months duration on tea cultivation for unemployed rural youth under Training of Rural Youth for Self Employment (TRYSEM) with the assistance of the District Rural Development Agency (DRDA), Nilgiris. Thirty six rural youth have been benefitted out of this programme.

During the last over a decade UPASI-KVK had received grants from various institutions, such as, ICAR, Tea Board, CAPART, HADP, etc. to the tune of over Rs. 1 crore. The schemes of KVK are monitored both by UPASI and by the respective donor agencies.

I would like to end this overview with the wise words on management of KVKs, expressed by Mr. R.C. Panda, Secretary to Government, Agricultural Department.

While speaking at the international workshop on 'Alternative and cost effective extension approaches for sustainable agriculture' held in Coimbatore in December 1994, Dr. Panda said as below :

> ". . . agricultural research was getting more and more alienated from the farmers and this blinkered approach was decimating the agricultural system. . . ."
>
> ". . . whatever be the extension system, it missed one vital aspect, i.e., land-to-land contact. There existed a big yield gap between the 'pilot plots' of the Krishi Vigyan Kendras (KVK), university research farms and the individual farmers' land. This was due to the rigid pattern of extension system. . . ."
>
> ". . . the extension system could not afford to be stagnant and static, but it should be made vibrant and vigorous, and must 'change according to the changing demands'. It had to

> be studied how long the government-run extension network should go and was delivering the goods. . . ."

I would like to quote from another veteran in the field, i.e., Dr. C. Prasad, Director, National Academy of Agricultural Research Management, Hyderabad, from his address in the same workshop.

> ". . . the training programmes are run on the principles of 'teaching by doing' and 'learning by doing'. . . ."

> ". . . the training programmes are followed upon the fields by giving farmers guidance, technologies and allied support by linking them with the input institutions. . . ."

> ". . . bottom-up model, demand-driven extension system, where the starting point is the farmer and field demonstration work — the farmer is the agent of change and the extension scientist is the supporter from behind. It is a helping-to-help-themselves concept; an 'extension by the farmer and for the farmer' philosophy. . . ."

> ". . . the demonstration will be an eye-opener for neighbouring farmers and will have a lot of induction influence. The demonstrating farmer may be called the 'Change Agent'. . . ."

> ". . . experience shows that it is not only technologies which have to be relevant to fit into the agro-climatic and socio-economic conditions of the farmers, but also extension approaches and methodologies. This implies that the approaches and methodologies will vary from situation to situation. . . ."

> ". . . extension approaches in rain-fed agriculture, hill agriculture or irrigated agriculture will vary considerably. . . ."

> ". . . extension scientists and workers and subject-matter specialists have basic weaknesses : the extension scientists and workers are weak in subject-matter knowhow, whereas the specialists are ill-equipped regarding extension design and methodology. . . ."

The credit for this achievement of UPASI-KVK goes to the band of dedicated officers and staff of KVK who could be truly called as "the Agents of Change".

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Only with the wholehearted co-operation of all its members
Now an association like this can be prosperous

— **A. SILVESTER**, UPASI

ROLE OF KRISHI VIGYAN KENDRAS IN TECHNOLOGY TRANSFER

By

Dr. S.D. RAI
PRINCIPAL SCIENTIST, ICAR

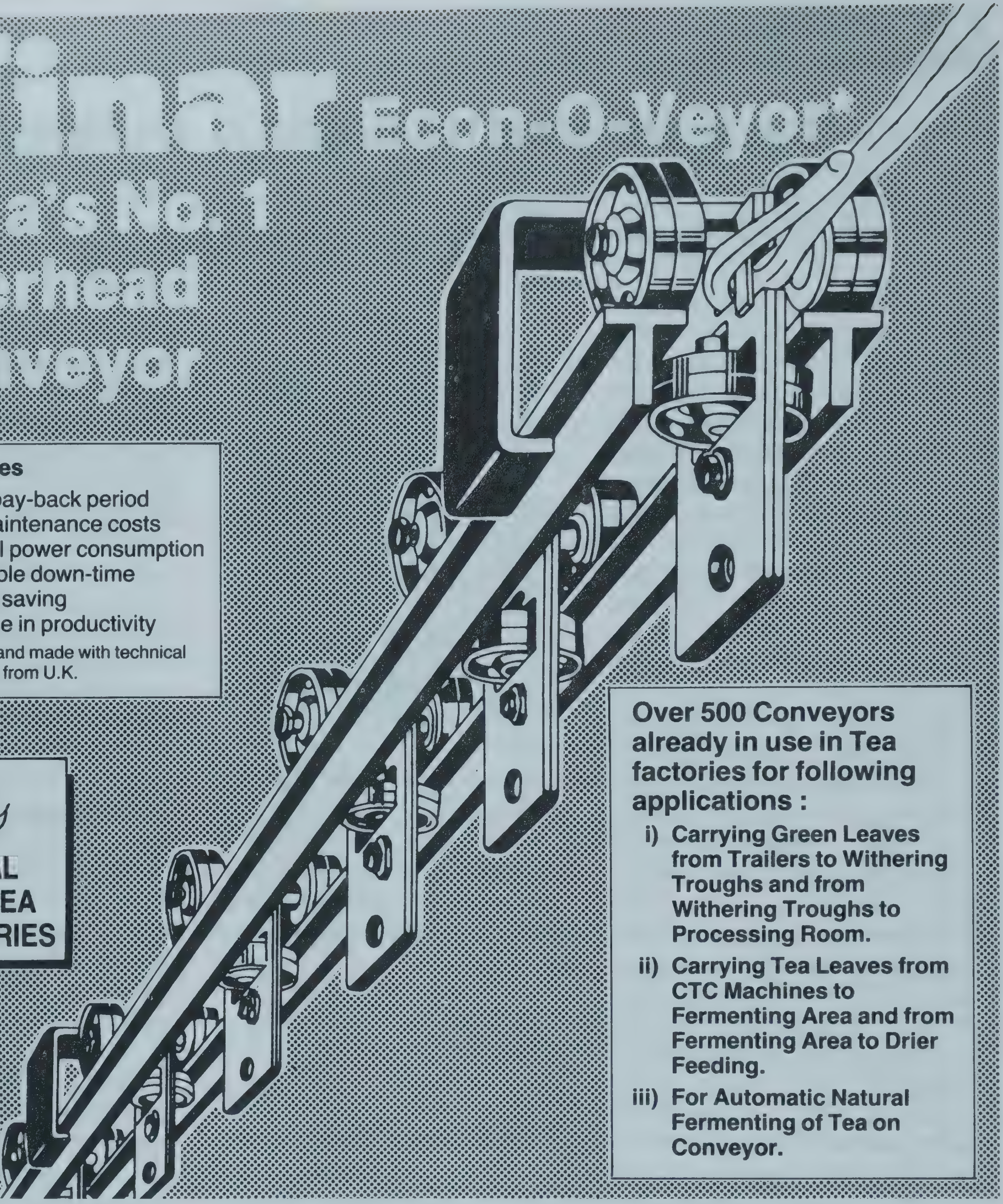
Krishi Vigyan Kendras (KCKs) are the noble Vocational Institutions at the district levels. They are also called the 'Farm Science Centres'. The first such Centre was established on the recommendation of Mohan Singh Mehta Committee in 1974 on Pilot basis in Pondicherry with the major objectives of imparting skill-oriented vocational training for farmers, farm women, village youth (boys and girls), school drop outs, village artisans, school teachers, grass-root level workers from the development departments, non-governmental organisation etc. The Kendras aim at work experience training following the Principles of 'Teaching by doing and Learning by doing'. In addition they are involved in conducting method and result demonstrations and other extension activities like farmers' fair, field days, agricultural exhibition etc.

At present, there are 261 Krishi Vigyan Kendras in the country out of which 34 are in Zone VIII which comprises of the States of Tamil Nadu, Kerala, Karnataka, Goa, Union Territories of Pondicherry and Lakshadweep. The State-wise break up of the Kendras is as below :

Karnataka	-	10
Kerala	-	9
Tamilnadu	-	12
Goa	-	1
Pondicherry	-	2

There has been revision in the mandate of KVKs based on the requirements of the farmers and agricultural modernisation. During 1992, the Kendras were assigned the additional functions of taking up farm advisory services which included the Lab-to-Land Programme i.e. testing of newly evolved technologies with resource poor farmers, testing the production potentialities of new improved high input technologies under green revolution farming systems with special reference to cereals and oilseeds. They also aimed at developing technical leadership in a few selected farmers. The Projects attached to the KVKs are Operational Research Programmes which included the upliftment of SC/ST families through resource-management and introduction of technologies, conducted problem-oriented demonstrations in larger areas involving the farmers and resource management in water-shed with the participation of farmers.

During 1993-94, the mandate of KVKs was again reviewed and modified based on the country's requirements. Now, the Kendras are to conduct location-specific on-farm testing/research in close collaboration with National Agricultural Research Project Centres of the State Agricultural Universities and their Regional / Zonal Research Stations. They will impart long duration skill training leading to self-employment.



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Also imparting training to the extension workers of various development departments including other organisations like NGOs and private organisations. The KVKs are also conducting Frontline Demonstrations on various crops / enterprises like oilseeds and pulses.

The contribution of KVKs has been laudable in the testing and transfer of valuable research information to the farmers' fields. In Zone VIII, the Kendras have achieved the following :

(i) The skill-oriented vocational training has been imparted to more than 15 lacs of farmers, farm women, school drop-outs, village artisans etc.

(ii) The Kendras have also imparted long-term skill training to a limited number of farmers/ youths and school drop out leading to self-employment resulting their settlement in rural areas. Today, there are large number of such youths owning their own nurseries for tea, coffee, fruit plants, flowers, vegetables. Also mini workshops for repair and maintenance of motors, pumps, sprayers, dusters etc.

(iii) Due to the efforts of the Kendras the new varieties/breeds appropriate to a particular region have been spread in the area.

(iv) There has been change in cropping system in many areas based on the KVKs efforts of introduction of new crops/varieties of more economic value.

(v) KVKs' efforts in SC/ST villages have helped in the socio-economic changes in the life of families. Now, such adopted families are owners of assets and quite happy and prosperous due to the introduction of Intergrated technological models by the KVK scientists.

(vi) The efforts made by KVK in resource management of water-shed basis has increased the cropping intensity of the Macro / Micro watershed from base less then 100 per cent to 200 per cent or more. There has been change in crops/enterprises from millets to cereals/oilseeds, plantation due to better recharge in wells / borewells and conservation of soil fertility and water. More availability of milk and meat, fruits, fodder, fuel etc. in such area due to scientific efforts of the scientists with active participation of the farmers.

Now, the efforts are on the way to document these achievements based on site characterisation, and eco-environmental characterisation in different selected KVK districts. ✪

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LETTERS TO EDITOR

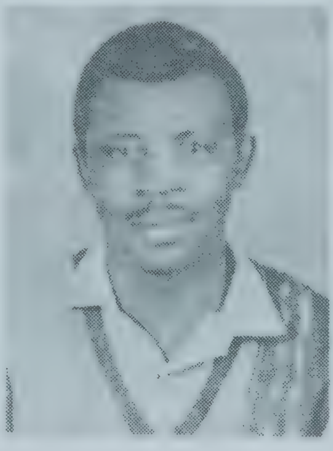
THE UPASI-KVK AND FARMER SKILLS DEVELOPMENT

The fundamental objective of any well-reasoned agricultural extension system is to assist in developing the capacity of farmers to help themselves and to improve their standard of living, in the long haul. This means that farmers must be able to carry out simple diagnoses of a number of field problems and proffer solutions to same without frequent recourse to extension workers. It goes beyond periodic transmission of production recommendations which are frequently not well-coordinated at the grass root level to tackle farmers' problems in a holistic way. Farmers have to be provided with broad-based knowledge and requisite skills through training, reinforced with field level practice, to do this.

This is where the UPASI - Krishi Vigyan Kendra (KVK) or Farm Science Centre is performing a wonderful job by imparting knowledge and skills, through vocational training, to small farmers, women farmers and unemployed rural youth, amongst others. The trainees activities are in tea cultivation, horticulture, home science, agricultural engineering and other aspects like apiary, mushroom cultivation, sericulture etc.

Emphasis of the training is placed on farmers' basic scientific understanding of the technical components of their farms and skills acquisition to grapple with the challenges of their enterprises through an interactive learning by doing. The development of farmers' knowledge and skills in this way prepares them for the challenges of 21st century.

Go to the farmers' fields and one will marvel at the enthusiasm with which farmers put into use the production technologies transmitted to them both during training and on-farm visits. The adoption rate and repeat adoption rate of most of the technologies are a clear manifestation of their relevance to the agro-ecological and socio-economic circumstances of the farmers. At Pudukadu village, the farmers adhered to the cultural practices for coffee, trees and mulberry cultivation and raising of nursery plants. The success story of the beneficiary farmers has encouraged farmers in the neighbouring villages to be a part of this positive development.



While at a meeting of the Pudukadu Farmers' Association, I was impressed with the integration of the KVK extension workers into village community system. They were seen and accepted by farmers as part of their developmental efforts. The extension workers participated effectively in the social activities of their farming communities. The cordial interpersonal relationship between the KVK extension staff and their farming communities makes one to reflect with nostalgia on the good old days when farmers looked at the extension workers as "super humans" wearing varying caps. Then, the extension workers were almost "everything" to the farmers. Based on the signals one is receiving from the UPASI-KVK, may be the old good days are around the corner, once more !

The success so far recorded by the KVK has encouraged the Indian Government to plan its replication in all districts. However, it is important to state that the success of the UPASI-KVK is largely due to its extra-departmental organisational structure. The UPASI-KVK is currently able to coordinate the activities of the relevant specialist disciplines at the farm level. The replication of the KVK implies that the individual state Department of Agriculture will have to play a prominent role in "globalising" the concept. Since the State Agricultural Departments are essentially "Crop-Centric", they would have a formidable role in coordinating the activities of the line/development departments at the farm level to make a success of the KVK.

If the current momentum of the KVK success is sustained in a cost effective way, that is, effectively reaching more farmers and developing their skills with a drastically reduced number of extension personnel and reduced resource commitments, the UPASI-KVK may well be a model for other countries to adopt.

J.A. ONIETAN

Management Development
Specialist/Consultant
Agri & Rural Management Training Institute
Korin, Nigeria.

I visited UPASI-KVK with regard to UPASI-CAPART projects on 8th and 9th April 1995.

I also visited the UPASI-CAPART rubber project at Kottayam on 17th April.

It was really heartening and overwhelming to witness such an excellent work being done by UPASI. The dedication, innovation and sensitivity shown by the staff is very admirable and very rare to find in such work. The organisation should be all the more commended for involvement of the people actually benefitting from the project and ensuring that all the benefit is reaching to those aimed at.

I thank you Sir, extending all hospitality and making the evaluation visit an enriching one.

I wish UPASI and its team all the best in such endeavours.

Thanking you.

NIKHILESH N.

APO (CAPART)
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AGRICULTURAL DEVELOPMENT AMONG FOREST-DWELLING TRIBAL COMMUNITIES

T. MADHAVA MENON

INTRODUCTION :

As a participant at the recently held Seminar on Development & Change among the Tribes of Tamil Nadu, I listened with interest to the presentation by Sri S. Ramu, UPASI Krishi Vigyan Kendra, Coonoor, on the impact of the Lab-to-Land programme undertaken among some tribal communities of the Nilgiris.

I take this opportunity of recording some reactions based on the experiences of a similar programme of intensification of agriculture in a settlement of Kattunaikkar (Kadu Kurumba) at Appankappu, near Nilambur, Malappuram district, Kerala.

The Kattunaikkar are an "ancient" tribe, autochthonous in the deciduous forests of the Kerala-Karnataka-Tamil Nadu trijunction. These forests were the sites for the famous *khedda* operations for the capture of wild elephants; the Kattunaikkar were the unsung heroes, driving the herds towards the palisades constructed for the purpose, and trapping them safely inside. The Kattunaikkar then served as the expert mahouts who tamed and trained the captives. They are still preferred by the forest department for employment as mahouts. Their main source of livelihood is the collection of minor forest produce, and "fugitive" shifting cultivation.

The area at Appankappu was constituted into a Wild Life Protection zone; it adjoined the Nilgiri Biosphere Reserve. Elephant capture had been discontinued long back. Shifting cultivation was severely put down; the collection of minor forest produce was brought under several restrictions. The Forest Department demarcated the area of their settlement, allotting land to ten or fifteen families there, totalling about 15 acres. Houses were constructed for them, and they were expected to survive by cultivating the lands allotted to them. The lands were fertile, along the banks of a stream, and fairly level in slope. An elephant trench surrounded it as it was in the migratory path of the herds. In 1984-87, the Kerala Agricultural University undertook a programme for introducing them to high productivity settled agriculture. The concept was that each family should produce crops for subsistence (millets, tapioca, paddy), for nutritional support (roots, tubers, pulses and grams, vegetables and fruits), and for exchange (pepper, ginger). Among the fruit species, pride of place was given to bananas (*Musa paradisica*), which grew luxuriantly in the virgin soil. The experiment was highly "successful"; the community was enthusiastic; the cultivated crops grew luxuriantly.

Unfortunately, the elephant trench was not properly maintained; it got silted up. Attracted by the heavy plant density of the cultivated area, a herd of elephants thoroughly raided the crops. One tusker came quite close to a house in which the humans huddled. Thanks to their familiarity with elephants, the Kattunaikkar did not panic; they kept quiet and none was hurt. But there was a tragic and predictable aftermath for the elephants; the herd had been led by a magnificent tusker, a prime candidate for poaching. It was found shot dead a short distance away from the settlement. The department suspected the tribal people; compensation for the loss of crop was considerably delayed.

Some Lessons :

Several lessons may be learnt from this experience. Firstly, in a condition where a human community has to live in a forest ecology, where wild life is strictly protected, settled agriculture becomes "unsustainable". The plant density of cultivated plots exceeds that of the rest of the forest habitat; wild life, especially elephants, develop a new survival strategy of crop raiding. Gradually, they shift their migratory paths to traverse areas where cultivation is continuously done, and become "constant" rather than "occasional" raiders.

The traditional shifting cultivation avoided this contingency because animals did not get "implanted" with the location of a particular site where cultivated forage would be continuously available. In addition, the type of survival crops that were cultivated, along with the retained natural vegetation, did not constitute much of a differential in plant density. Occasional raids by wild pigs and deer were managed by the tribal cultivators with traditional hunting and trapping technologies — they never had to, nor were they equipped with the means to resist the master of the jungle, the mighty elephant. Typical of the tribal respect for the elephant is the story narrated to me by a Muduga elder about 40 years back, at Mukkali in Attapady, then a thick evergreen forest region. According to him, the elephant is the ancestor; the tribe would put a good portion of their agricultural produce including residues on top of a hill overlooking their settlement. This happened to be a divide in the migratory path of the elephants. The animals would eat their fill and go off in another direction, away from the inhabited sites.

Once a human community in sufficient numbers takes to settled cultivation, the loss of forests and the elimination of wild life become inevitable and irreversible. Engineering works like fences, simple or electrified, trenches and ditches, etc., are excessively costly both to establish and maintain. Humans tend to cross them in pursuit of more areas to cultivate, thus inviting crop raiding; then they raise louder complaints than ever. Re-siting of human populations away from forest habitats rich in animal life entails cultural changes apart from the costs involved. The capture and evacuation of elephants to sanctuary areas is also costly. Humans tend to get back to their original locations; so, it has been reported, do elephants.

Intensification of agriculture as a strategy for tribal welfare is therefore limited to areas where the interface with wild life has been sufficiently shifted in favour of the humans. Future development should take into account the migratory paths of the wild life and the availability of natural forage species preferred by the animals. The cultivated species should be of such character and of such density as NOT to constitute an alternative survival strategy for the wild life by crop raiding. At the same time, edaphic factors should be maintained as far as possible intact in order to ensure sustainability.

Objectives & Conditions :

The first choice must be for "survival" crops; millets, maize, paddy wherever suitable, roots and tubers. If these are neglected, the community will become dependent on the market and the public distribution system for their survival. As the locations are usually distant and communications difficult in precisely the seasons when the greatest need is felt, the distress persists in spite of monetary surpluses. Secondly, the community should have assurance of availability of protective foods; the traditional protein sources provided by small hunting and trapping are nowadays denied. The crops of choice will be green leafy vegetables, protein rich grams and pulses, tree crops like *Moringa,* jack, mango, tamarind, etc., chillies and spices. Fruit trees will provide forage for the bees which will provide honey. After these priorities are met, crops for exchange like ginger, pepper, mulberry, etc., may be grown. The last named is doubly beneficial because of the opportunity of value addition in the form of silk worm rearing. Among the Muthuvan of the Idukki district, cardamom curing provided an avenue for value addition.

Certain "conditions" are important. Firstly, zero or minimum tillage techniques should be developed, both because of manpower as well as terrain constraints. This should be achieved without recourse to chemical weedicides. Tribal farmers already know tillage technologies where the problem of weeds does not arise — they find a use for all plant species! The Palu Kurumba of Attapady, close cousins of the Alu Kurumba of Nilgiris, found a use even for the obnoxious *Eupatorium odaratum,* introduced into South Indian forests after World War II; it makes a good poultice for some types of boils and wounds. The forest-dwelling Kanikkar of Trivandrum district shift their cereal cultivation within the holdings (5 to 10 acres per family) demarcated by the Forest Department. This is consistent with the culture of shifting cultivation and has several advantages; soil micro-nutrients are not excessively used up; "weeds", including legumes, multiply in the previously cultivated plot and provide bio-mass which can be used for several other purposes.

Cultivars should be selected such that they are naturally resistant to the pests and diseases of the locality. The introduction of high yielding varieties of pepper in the

Wayanad introduced the quick wilt disease, the wild and the native varieties were comparatively free of the infection. "Improved" cardamom varieties in Idukki High Ranges were susceptible to *katte,* but the native cultivars selectively bred from available material by the Muthuvan were free from it; there was a 15-kilometer wide belt of natural forest surrounding their area. Tribal preferences, I have found, are wisely for survivability of the plant naturally in the surroundings and for taste and palatability. Insects and predators achieve a natural balance if left to themselves, and if maximization of "tonnage productivity" is not an objective. Chemical applications are best avoided; the soil micro-flora may be so delicately balanced that the slightest disturbance entails irreversible consequences.

"High-Tech" possibilities :

These conditions are challenges to "High-Tech" agriculture. One of the tasks is to screen the native plant material and identify individual "ideal" plants, from which tissue culture techniques could produce replicas. Zero tillage without chemicals, maximization of bio-mass production without fertilisers, plant protection by biotic factors, utilisation of all plant species growing in an area by discovering in them new sources of valuable products — these are a few more.

Extension Philosophy :

The conventional relationship of the change agent as the innovator and preceptor has to be changed in tribal situations. The tribal person has had the wisdom of centuries of survival, with ecologically non-invasive technologies, which were also energy-efficient. He survived in a stable condition with the forest and its denizens. These equilibria have been upset; in "rehabilitating" him, let us minimise the disturbance, and maximise the benefit to the coming generations of all of us.

(T. Madhava Menon — MA in Economics (Annamalai University, 1950); joined the Indian Administrative Service 1952; held several posts among which : Collector, Palghat district; Managing Director, Travancore Titanium Products Ltd., Secretary to Govt. of Kerala, Industries Dept.; Custodian of Vested Forests, and concurrently, Director of Tribal Welfare, Kerala; Agricultural Production Commissioner; Commissioner, Civil Supplies; Vice-Chancellor, Kerala Agricultural University; Retired in 1987; Currently Chief Editor, Encyclopaedia of Dravidian Tribes, International School of Dravidian Linguistics, Trivandrum 695 586.)

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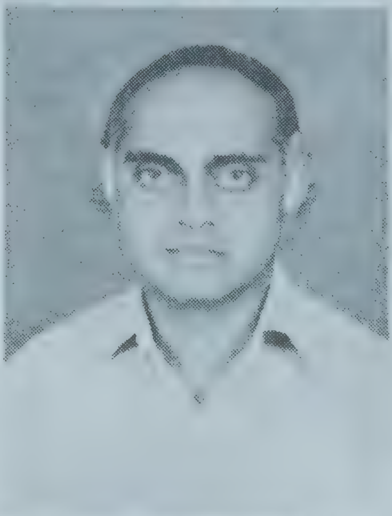
NILGIRI TRIBES TOWARDS PLANTATION ECONOMY

By



Dr. JAKKA PARTHASARATHY*

Tamil Nadu, one of the major States of the Southern zone in India, consists of important tribal groups. According to 1991 census, the Scheduled Tribe population in Tamil Nadu is 574194, constituting 1.02 per cent of the total general population. There are thirty six scheduled tribes of varying numerical strengths in the State. Most of the scheduled tribes live in hilly and remote areas by primitive subsistence living, and a large number of them are food gatherers by tradition, and are widely distributed over seventeen districts in Tamil Nadu State. Among the 36 scheduled tribes of Tamil Nadu, Government of India identified six groups as Primitive Tribal Groups, mostly they are found only in the Nilgiri district.

The Nilgiri district, also called as 'The Nilgiris' or 'The Nilgiri Hills' is one of the smallest districts in Tamil Nadu. Etymologically the word 'Nilgiris' means 'Blue mountains'. The district is a hilly area of 2549.0 sq.kms. located between 11°10' and 11° 30' N latitude and between 76° 25' and 77° 00'E longitude at the junction of the Eastern Ghats and the Western Ghats. With an average elevation of 6500 ft. the Nilgiri district is surrounded on the West by Kerala, on the North by Karnataka and on the Southeast by Coimbatore district, it therefore occupies the highest and Western most parts of Tamil Nadu State. Nilgiris are characterised by pronounced seasonality with respect to hygric conditions. Nilgiri plateau make up the four vegetation types, to be distinguished, viz, the moist ever green forests, the dry deciduous forests, the evergreen montane forest (sholas) and the grass lands and savannas. Through three principle periods – aboriginal, colonial and national Independence, the Nilgiri region has undergone a quite irreversible transformation.

According to 1991 census, the total population of the Nilgiri district is 710214, out of which the total scheduled tribe population is 25048, constituting 3.53 per cent of the total general population. The scheduled tribe population in Nilgiri district is not evenly distributed in the four taluks. 46.51 per cent of the tribes are living in Gudalur taluk; 24.18 per cent are living in Kotagiri taluk; 20.35 per cent of them are living in Udhagamandalam taluk and remaining 8.96 per cent are living in Coonoor taluk. According to Nilgiri district Collectorate notes (1989), the scheduled tribe-wise total population in Nilgiri district is as follows: Todas 1600; Kotas 1894; Kurumbas 4874; Irulas 5900; Paniyans 5700 and Kattunayakans 1400. Todas, Kotas, Kurumbas and Irulas along with the Badaga community, are considered as 'Indigenous groups' The Badaga, an agricultural community, who migrated to the Nilgiris long back, are also found throughout the district. The other population, which includes Tamil, Malayalam, Kannada and Telugu speaking peoples as well as North Indians are considered as 'Immigrant groups'. The Nilgiri district also became the second home of thousands of repatriate families who left Sri Lanka during the last two decades. Before going to discuss about the occupation and change, let us know about the ethnographic details of scheduled tribes of Nilgiri hills.

THE TODA :

The Toda are known by several names like Tudas, Tudavans, Toras and Todar. They are found only in Nilgiri district. The name Toda is supposed to be derived from the word 'tud', the sacred tud tree (Meliosma simplicifolia) of Todas. Toda dialect is an independent language of the Dravidian family affiliated with Tamil-Malayalam. The uniqueness of their half-barrel shaped houses given speculations regarding their origin ranged from Rome to Sumeria. The Toda village is called a 'mund', means a herd or a cattle-pen. The

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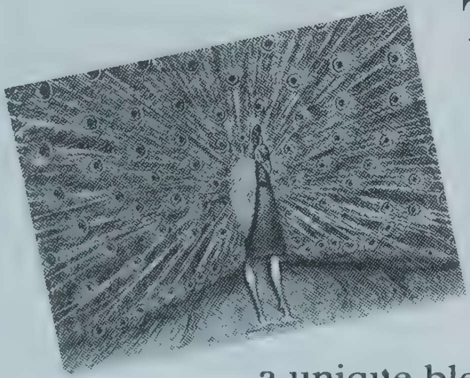
* Senior Lecturer in Cultural Anthropology, Tribal Research Centre, Tamil University, M. Palada (P.O.), Udhagamandalam - 643 004.

"Only Nature can create such perfection...



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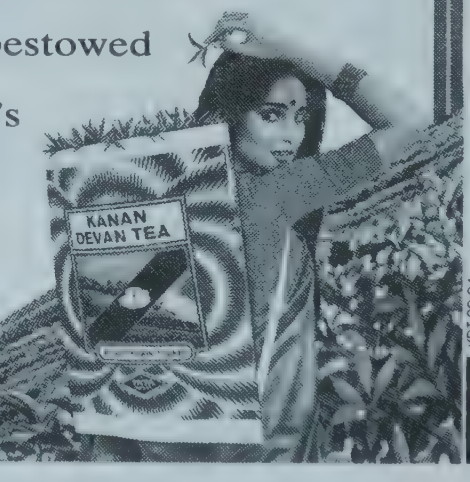

KANAN DEVAN TEA
KDT 29 94

traditional garment of a Toda, known as put-kuli, is of thick white cotton cloth with red and blue strips which is embellished further embroidery by the Toda women, is thrown around the body by men and women like 'Roman toga'. They are traditionally lacto-vegetarians. They were a typical example of fraternal polyandry, also referred as Adelphic type of polyandry, is a form of plural marriage, warrants that the husbands who marry a woman are brothers in relationship among themselves. Now, polyandry as a continuing family arrangement has almost disappeared from the Toda community. During the dead body cremation, they sacrifice a number of buffaloes. The Toda were purely a pastoral people. The care of buffaloes and the duties connected with the dairy formed the sole work of the Todas. Their concept of religion is associated with the dairy and buffaloes. The goddess 'Tokisya' is honoured by them as their principal deity. A few Todas have embraced Christianity.

THE KOTA :

The Kota are known by several names like Koter, Kotharu, Kothewars and Kohatur. They are found only in Nilgiri district and distributed only in seven settlements. The derivation of the name Kota is from the Dravida root 'Ko' or 'Ku' meaning mountain. They speak Kota dialect, an old dialect of Kannada, mixed with Tamil words. The Kota village is called a 'Kokkal', represent a linear type with two or three localities called `Keris'. Their traditional garment is known as `varad', a white bed-spread cloth, is thrown around the body by men and women. They are non-vegetarians. They were a typical example of the patrilocal extended families, where the rule of residence is virilocal. They cremate the dead body and sacrifice a male buffalow. The Kotas are the only artisan community on the hills of the Nilgiris. They have been smiths in gold and silver, they are carpenters, blackmiths, potters and musicians. The Kota follow Hindu religion and worship their deities, Kambatryan and Kambatiswari in the name of Ayyanor and Ammanor.

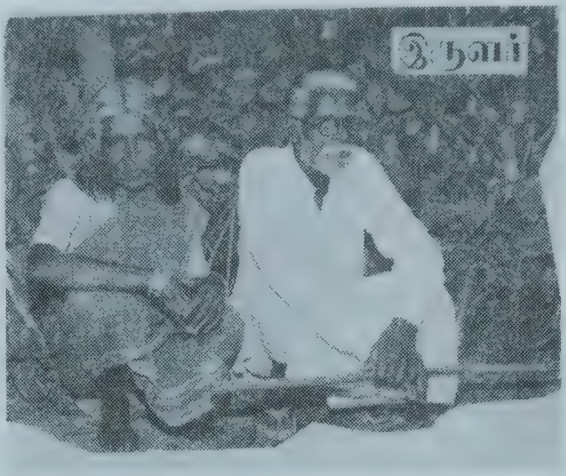
THE KURUMBA :

The Kurumba of Nilgiri hills are entirely different from other names like Kuruban or Kuruba. To avoid confusion of names, Government of India, declared that, those Kurumbas who are living only in Nilgiri district are categorised as Scheduled Tribe. It is possible that their name originated from the Tamil word 'Kurumbo' (mischief), because in their savage state they were very arrogant and mischievous. On the basis of region of residence in the Nilgiris, the Kurumbas are identified as six distinct Kurumba tribes. They are Alu Kurumbas, Mudugas, Betta Kurumbas, Jenu Kurumbas, Mullu Kurumbas and Urali Kurumbas. Each of these is a distinct ethnic group, differing from the others in language, religious beliefs and other cultural features. The Alu Kurumba and the Mudugas do inter-marry with each other but the remaining four are endogamous. The Alu Kurumba speak Tamil dialect mixed with more Kannada words. The Kurumba settlement is called a 'mottam'. They are non-vegetarians. They follow the custom of

burial with elaborate funeral rituals. The Kurumbas were hunters, shifting cultivators, effective sorcerers and basket weavers. They were animists, now believe Hindu religion and worship goddess 'Kurupade tayi'.

THE IRULA :

Irulas are one of the major tribes of Tamil Nadu and are distributed in ten districts which includes the Nilgiris. The name Irula is supposed to be derived from the Tamil word 'irul' meaning darkness, which may refer to their black skin complexion. The Irula of Nilgiris are also known as Mudumars (Southern Irulas), Kasabas (Northern Irulas) and Urali Irulas. They speak 'Irula' which is a South Dravidian language of the Tamil-Malayalam sub-group. Irula settlement is called as 'Arai'. They are non-vegetarians. They are divided into seven exogamous divisions called 'Kulams'. They bury the dead. The Irula were hunters and forest produce gatherers and also shifting cultivators. The Irula are partly Hinduised, but have their own autochthonous — indigenous religious system. An Irula priest performs rituals at famous Rangaswamy temple in Nilgiri hills.



THE PANIYAN :

In Nilgiri district, the Paniyan are found only in Gudalur taluk. The term 'Paniyan', literally means a 'worker' is the modified form of the Malayalam word Panikkar (labourer). They resemble the African tribes in their curly hair and thick lips. There are numerous speculations regarding the origin of the Paniyans. Some are of the opinion that they are an African tribe that came into India after a shipwreck on the West Coast. . . At one time in the past they were the principal stock-in-trade for slave trade on the West Coast, and it is possible that they were imported from Africa and sold in Malabar. It is reported that the Paniyan found in Gudalur taluk were brought over long ago from Wynaad region (Kerala State) by the Mandatan Chettis as agricultural labourers. The Paniyan speak a dialect mixed with Malayalam and Tamil words. The Paniyan settlement is called as 'Paddis'. They are non-vegetarians. They were a typical example of the avunculocal extended families. This type was typically composed of a man and his wife, his young sons and unmarried daughters and a sister's son and his wife and children. They bury the dead and celebrate funeral rites elaborately.

Their chief occupation is agricultural labour. They subjected to a subtle form of bonded labour by the local non-tribal land owners. They follow the religious cult of animism and worship goddess 'Kattu Bhagavathy'. A few Paniyan embraced to Christianity.

THE KATTUNAYAKAN :

In Nilgiri district, the Kattunayakan are found only in Gudalur taluk. They are also known as Kadu or Shola Nayakans and Jenu or Teen Kurumans. Their name correctly connotes that they are the Nayakans (chiefs) of the Kattu or Kadu (forest). They claim to be autochthons of the Western Ghats. They speak a Kurumba dialect mixed with Kannada, Malayalam and Tamil words. Kattunayakan's village is called 'Padi'. They were typical example of the people live under wind-breaks resting against a tree or in the hollows of trees. They are non-vegetarians. They bury the dead near their habitation and thereafter it was customary to desert that locality and even carefully avoid visiting. There were reports that the hut in which death

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occurred is destroyed. They were hunters and food gatherers. They are experts at collecting wild honey and wax. They were animists and totemists, but now most of them claim to be Hindus. They worship the god named as 'Bairavan'.

PLANTATION ECONOMY :

In the past, the inhospitable climate and thick and feverish forest of the Nilgiri hills never attracted the territory invaders, except the bold tribal people who were pastorals, artisans, hunters and gatherers. The first description about the Nilgiri plateau was mentioned as early as 1117 A.D. in a Kannada inscription, which may be found in B. Lewis Rice 'Epigraphica Carnatica'. The internal history of the district, down to the date of the English occupation in 1799, no definite record is available. In the early 19th Century, the British administration, discovered the Nilgiri hills as temporate haven. In 1822, the Englishman, John Sullivan, Collector of Coimbatore, purchased some land from the Toda, on the site of what is now called Ooty town developed. Ooty, on the Nilgiri hills has become India's first hill-station. The British soon built a network of roads linking with the plains of Coimbatore, Mysore and Malabar, thus making the high plateau more accessible to lowlanders. The settled British people discovered the suited Nilgiri soils and climate for commercial crops. European fruits and vegetables were introduced in gardens and small farms. Large areas were planted with tea, coffee and later cinchona, acacia and eucalyptus. As land became increasingly valuable, the British administration in 1863 prohibited the practice of `slash-and-burn' cultivation on all land not actually owned by the farmers concerned. This effected occupational change among the tribal communities living in the hills. The establishment of market centres, monetary benefit of cash crops and the opportunity to earn wages further effected the traditional occupations of the tribal people.

In the past, plantation agriculture was completely unknown to Todas. The earlier attempt by the Todas to try plantation was made in 1892 by asking permission to cultivate potatoes on their grass lands, to the district collector and the permission was given. Then the government of Madras State in 1929 allotted land to Todas. Since then many Todas took to potato cultivation and then slowly to cultivate wheat, barley, tea, coffee and English vegetables.

Kotas, the industrial art experts of the Nilgiri hills were the first tribal group to accept new occupation of agriculture and enjoyed the benefits of plantation economy. Now most of the Kotas are actively involved in plantation economy, by growing tea, coffee and vegetables. The continuous rivalry on the subjects of symbiotic relationship, untouchable treatment and bonded associateship with Badaga families, between accepted father and revolted son within a Kota family caused adoption of plantation economy among the Kotas.

The Alu Kurumba and the Irula, who were hunters and gatherers, practised shifting cultivation, gradually accepted plantation labour as wage earners and a few of them, who involved in community farms, started growing tea, coffee etc. The released bonded labourers of the Paniyan, who rehabilitated in government run farms are now developing plantation skill and growing tea, coffee, interspersed with jack trees, guava, tapioca, ginger etc. The Kattunayakans, besides gathering the minor forest produce, and employed by the Forest Department as elephant mahouts and watchers, some of them recently used to cultivate small patches of land on hill slopes. A few have become wage labourers in tea estates.

The post Independence tribal development programmes by the State Government are encouraging the Toda, the Paniyan and the Kattunayakans to adopt plantation economy. The farm science centre, 'Krishi Vigyan Kendra' of the United Planters' Association of Southern India (UPASI) is actively promoting the small growers of the Kota, the Alu Kurumba and the Irula, by imparting scientific crop husbandry techniques in plantation crops for increased production. Their Lab-to-Land scheme, started in 1984, gives good results among the tribal farmers in the management of the plantation crops with their native skills. There is a sacred hope to the Krishi Vigyan Kendra to fulfill the conscious aspirations of all the tribal people of Nilgiri district towards better and productive plantation economy. Tribal gods will bless those who work for the welfare and development of the tribal people.

ACKNOWLEDGEMENTS

The author is grateful to Dr. Avvai T. Natarajan, Vice-Chancellor, Tamil University, Thanjavur for extending necessary facilities to carry out this work. The author is thankful to Mr. D. Ravindran, Secretary General, UPASI and Mr. S. Ramu, Specialist (Agriculture extension), KVK-UPASI, Coonoor, for their encouragement to write this paper. ✪

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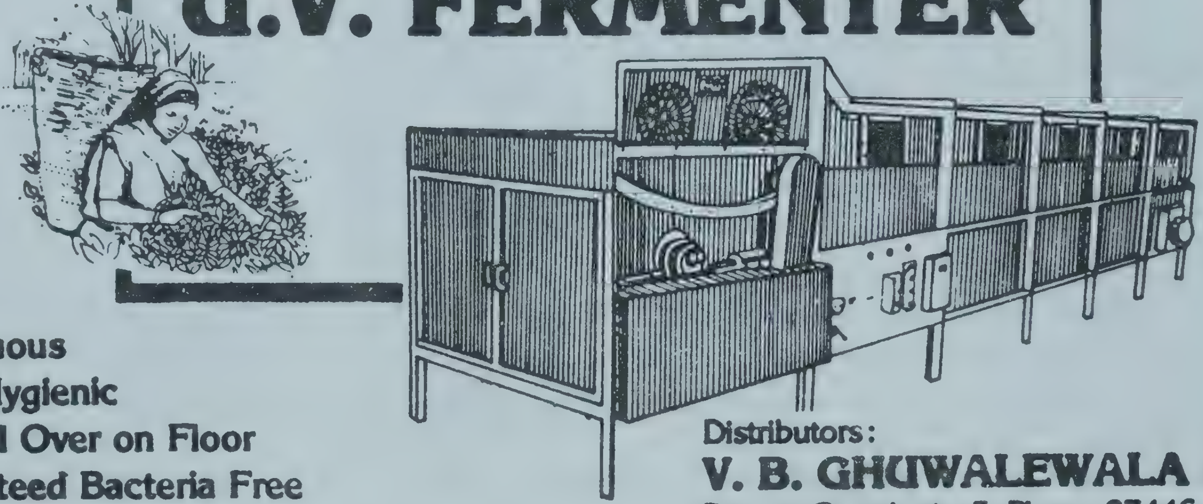

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INDIA'S FARM SCIENCE CENTRES
(Krishi Vigyan Kendras)

Dr. V.G. DHANAKUMAR*

The training of rural men, women, and youth is of critical importance in the acceleration of agricultural production of the one hand and the increasing of employment and income of the general farming community on the other. In an agricultural country like India, farmers' training is a giagantic task and requires a heavy investment in training infrastructures to reach most of the farmers on a regular basis. Science and technology in agriculture, like in any discipline, is changing fast. Also we are increasingly realising the vast and diverse quantity and quality of indigenous knowledge among farmers which needs to be better shared. Training institutions must keep farmers abreast with the latest information that can be used to raise productivity.

History :

Farmer's training, either by government or non-governmental agencies, has a long time as an *ad-hoc* and sporadic endeavor. Since, 1960, farmers' training and education programs were promoted on a formal and regular basis-an important development indeed. In 1964-66 the education commission recommended that viroorous efforts be made to establish specialised institutions to provide vocational education in agriculture and allied fields at the pre and post-matriculate levels to cater to the training needs of a larger number of boys and girls coming from rural areas. The commission suggested to name such institutions as "Agricultural Polytechnics". This recommendation was thoroughly discussed during 1966-72, involving the Ministry of Education, Ministry of Agriculture, Planning Commission, Indian Council of Agricultural Research (ICAR) and other allied institutions. Finally, the ICAR agreed to establish Krishi Vigyan Kendras (Farm Science Centres) as innovative institutions for vocational training for farmers and field level extension functionaries. The first KVK was established in 1974 at Pondicherry, Tamil Nadu. Now, there are 261 KVK's in the country.

Concept and Principles :

A conceptual framework, precedes operational details as a base. The KVK was formulated based on the following basic concepts.

The KVK will impart learning through work-experience and hence will be concerned with technical literacy, the acquisition of which does not necessarily require as a precondition the ability to read and write. The Kendra will impart training to only those extension workers who are already employed or to the practicing farmers and fisherman. There will be no uniform syllabus for Kendras. The syllabus and programme of each Kendra will be tailored to the felt needs, natural resources and the potential for agricultural growth in the particular area. These Kendras are the grass-root level vocational training institutions designed to bridge the gap between available technologies at the one end and their application for increased production at the other. The success of these Kendras would depend upon adherence to the three basic principles :

a) Acceleration of agricultural and allied productions should be the prime goal;

b) "Teaching by showing" and "learning by doing" should be the principle methods of imparting skill training; and

c) Training efforts should not be made to make economically advanced people better, but to raise the living conditions of the poorest of the poor.

Objectives :

The Krishi Vigyan Kendras provide strong training support for bringing about production breakthroughs in agriculture. The main objectives are :

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* **Principal & Chief Training Organiser, UPASI-KVK, Coonoor - 643 101.**

1. Planning and conducting surveys of an operational area in order to prepare resource inventory with special reference to identifying the training needs of the farming community.
2. Planning and conducting production-oriented, need-based short and long duration training courses both in the campus as well as in the villages for various target groups with priority on the weaker and the poor.
3. Developing and organising non-formal eduational programmes by way of field days, farm visits, farmers fairs, radio talks, Farm Science Clubs etc. as follow-up information support to training courses.
4. Organising Farm Science Clubs, both in rural schools and in villages, in order to induce in the younger generation a liking for and an interest in agricultural and allied sciences and for effective farming through supervised projects.
5. Developing and maintaining the campus farms and demonstration units as the facilities for providing work-experience for the trainees and as centres for disseminating the latest technical know-how.
6. Providing access to the practical training facilities of the Kendra for teachers and students of vocational agriculture classes of the higher secondary schools.
7. Imparting some general education to rural illiterates and school drop-outs in order to make them not only good farmers but also better citizens.
8. Providing added training facilities in home-making and nutrition education for rural communities.
9. Gradually enlarging the training facilities to encompass other important areas such as home crafts, and cottage industries consistent with the requirements of the Integrated Rural Development Programme in collaboration with concerned organisations.
10. Implementing all such schemes of the ICAR and other related organisations which intend to strengthen the training programmes of the Kendra.

Types and Distributors of KVK:

Three types of implementing agencies / institutions are involved in the KVK training programme; Agricultural Universities, ICAR Institutes, some selected voluntary organisations for which the necessary technical expertise and support are made available by the nearby ICAR Institutes / Agricultural Universities. The KVKs organise both residential and non-residential courses of varying duration depending upon the specific needs of the target groups. There has been much discussion of late within India about increasing the number of these KVKs so as to have one far each of the 540 districts in the country.

Curriculum :

KVK curriculum planning is a group effort. All connected with the course, either directly or indirectly, must be consulted course formulations. Defining the genral as well as a specific objectives of a course based on the felt needs of the proposed trainees is the first and most important step in the process of training course formulation. In order to have the objectives clearly conceived, a systematic survey of the selected villages is carried out and a sample of farming families is selected. Other methods such as personal observations, personal visits, and group contracts may also be utilised to determine the content for various training courses.

Course outlines are divided into two portions :

1. Knowledge and understanding.
2. Understanding and skills.

Functioning of KVKs :

In organising and conducting training courses, three basic stages are followed :

a) Planning stage
b) Execution stage
c) Follow-up stage

In the planning stage, the technological gaps are identified and understood and priorities ascertained for training purposes based on surveys, group discussions, and personal visits to farmers. In addition, discussions, are held with concerned villagers in order to inform them and achieve greater enlightenment about problems and prospects for resolving them. This develops motivation to undertake training as one of the pre-requisites for solving farm problems. To make the training programme effective, care has been taken to make trainees comfortable and to sustain their curiosity and interest throughout the execution stage. In the follow-up stage, in order to harvest the benefits of training programmes on a sustained basis, it is necessary to create in trainees ample aptitude and interest in appropriate technology, to enable them to see its potential value to efforts to increase production, to increase income and to promote self-employment. For this purpose, linkage with term basis. Evaluation studies are conducted during this stage. Involvement of field extension workers in all the three stages of training programmes creates a sense of responsibility among them. These extension workers, in turn, help in carrying out follow-up work.

FUTURE PLAN :

The ICAR's objective is to establish one Kendra in each district with the full support of the State Governments, leaving the latter to set up the remaining two kendras with their own resources. It has also been recommended that farmers training centres of the State Governments should be converted into kendras for the sake of economy, uniformity as well as upgradation of the centres in the larger interests of the farmers.

In view of the growing sophistication in farm science, the future extension system should be one where varied training programmes can be organised for progressive, young farmers and farm women, and good demonstrations conducted by scientists who know the technology as well as the methodology. Also, the extension activities will demand the presence of subject-matter specialists in all disciplines at the district level.

As a result, the kendras are expected to play an important role in the broader framework of the extension system in the country. Once there are three kendras in each district, we will perhaps have the ultimate model for extension. At this point of time, this is wishful thinking.

✪

PERSONALIA

NPA CHAIRMAN

Mr. D. Hegde, Senior Manager, the United Nilgiri Tea Estates Company Limited, Chamraj Estate, Nilgiris, has been elected Chairman of the Nilgiri Planters' Association in the vacancy caused by Mr. B.C. Somaiah.

RETIREMENT

Dr. V.S. Sharma, Director, UPASI Tea Research Institute, has retired from the UPASI services on the 17th April 1995.

OBITUARY

Dr. K. RAMAN

Dr. K. Raman, Chief Scientific Officer, The Bombay Burmah Trading Corporation Limited, Mudis, died on 27th March 1995.

Dr. Raman had been associated with the UPASI Scientific Department as Plant Physiologist from 1980 to 1986. He is survived by his wife and three children.

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UPASI-KVK AND TRIBAL DEVELOPMENT

S. RAMU*

The LAB-TO-LAND Programme and SC/ST Projects are enjoying prime importance among the various transfer of technology projects being operated under the UPASI-KVK. Having both research and extension components, this programme aims at generating and testing such technologies which are appropriate to the given socio-economic and agro-ecological background of scheduled tribe farmers on the one hand and on the other, it aims at the upliftment of tribal farmers in transferring the latest technology in agricultural production and allied areas. This article highlights the impact of the Lab-to-Land Programme in the tribal areas of the Nilgiri hills, which is in operation since 1984.

India has the largest scheduled tribe population compared to any other country in the world. Scheduled tribes are relatively more disadvantaged groups than the rest of the segment of Indian population. There are about 250 types of scheduled tribes in our country who are socio-economically weaker communities. Some of them are still engaged in food gathering and shifting cultivation. The tribal population in the country is over 67 million (1991). The greatest strength of tribal population is their social cohesiveness, hardworking nature and honesty.

In Tamil Nadu the tribal population is 5,74,194 (1991). But the primitive tribes are found in the Nilgiris hills where six types of tribes are living with unique occupation, life styles, customs and tradition. There are more than 5000 tribal families from 350 hamlets with the population of 25048 (1991).

TRIBAL AGRICULTURE :

Agriculture is the primary source of livelihood for the vast majority of the tribal population, though the major area of the agriculture is under shifting cultivation. The tribal areas are generally characterised by undulated terrain, dense forest, poor communication and low population density. On analysing the geographical conditions and social / cultural background, the promotion of agriculture in the tribal areas receives top priority.

Agriculture in the tribal area of Nilgiri hills differ greatly with plough farming in the plains. Most tribal people in the hills once practised a shifting type of cultivation. This is mainly due to nomadic characteristic and also geo-physical conditions of the hills.

Due to the rapid loss of soil fertility, the shifting cultivation is abandoned after one or two years, and a new plot is selected for fresh cultivation. The interval period is mainly dependent upon the density of population of the area and availability of sustainable hill slope. Apart from the deforestation and consequent soil erosion in the hills slope, such cultivation offers very little scope for economic upliftment.

LAND OWNERSHIP :

In tribal areas of Nilgiri hills, although individual ownership of land is recognised in certain areas, such ownership is usually confined to homested. In most of the tribal areas in Nilgiris the land is owned by the community as a whole. Each village, however, operates in a particular demarcated area and the power of distribution of the land for cultivation to the farmers is vested with the village headman or village council.

It is observed that due to non-fixity of tenurial right, the farmers have little attachments to the land in which they operate. They do not take any interest for the improvement of the land for future use.

---

* **UPASI Krishi Vigyan Kendra, Coonoor - 643 101, The Nilgiris, Tamil Nadu.**

MARKET ECONOMY :

Isolated habitate of tribals in interior areas helped them to evolve a self sufficient economy. In a subsistance economy, there is little demand to induce people to produce more for sale. In the interior village, business transactions are mostly on barter system and there is a little scope of monetisation of these transactions.

Our field experience indicates that most of the tribal people react immediately and favourably to the market forces. They are willing to produce considerable quantities of agricultural products if they find some market outlet.

The problem of agricultural development in the Nilgiri hills are centred around various socio-economic considerations such as improvement of infrastructure, changes in social habits, customs, creations of demand for goods produced, conveyance facilities etc.

Keeping in mind that the agriculture is going to be the predominant pattern of tribal economy for a long time to come, the UPASI - Krishi Vigyan Kendra commenced the Lab-to-Land programme for the first time in the tribal villages to up grade their living conditions, through the implementation of agriculture and allied activities.

LAB-TO-LAND PROGRAMME :

One of the aims of the Lab-to-Land programme is to improve the overall socio-economic conditions of the tribal farm families by not only increasing the productivity of their farms but also by creation of additional employment through diversification of agricultural enterprises.

Based on the Bench Mark survey carried out in the village a farm plan was drawn to assess the resource availability and the needs of the tribal farmers.

On priority, cropping pattern was changed from the annuals to plantation crops like tea, coffee etc., to avoid the recurring failures in the traditional rainfed cultivations. Their native skills were encouraged and strengthened, apart from promoting income generating enterprises like apiculture, rabbit rearing, poultry, sheep rearing etc. Special programmes were introduced for women which includes tailoring, raising nutritional gardens, child care, community nursery etc. In this paper the specific tribal community viz. Alukurumbas who command one of the most backward status among other tribal communities of the hills was taken for the study with the following objectives.

Objectives :

- To study the profile of the respondents.
- To find the nature and extent of agricultural land utilised.
- To study the consequential changes with regard to the farming system.
- To identify the socio-economic changes that had taken place due to the implementation of LLP.
- To identify suitable strategies for necessary improvement in the implementation of the programme.

METHODOLOGY

100 beneficiaries using random sampling technique from villages in Coonoor and Kotagiri taluks viz Banagudisholai, Bhaviyoor, Kolithurai, Manalihada, Nedugalcombai and Pudukadu were selected. The data was collected using structural interview schedule and observation techniques. The above villages were selected for the study as the schemes were implemented in five phases between 1984 and 1994.

Before implementation, a benchmark survey was conducted and action plan was drawn. For evaluation and monitoring purpose, family wise records were maintained on cropping pattern, technologies adopted, type of inputs used, yield performance and extension activities during the course of implementation.

After implementation the overall impact of this programme, among the beneficiaries was studies using a structured, pre-tested interview schedule. The data was processed and presented below :

PROFILE :

The profile characteristics viz., Age, Education, Occupation, Average family size were analysed and they were grouped and presented in Table - I.

Age :

Most of the benficiaries are under middle age group followed by young. The tribal custom favours the family fragmentation after the marriage; thus in majority of the cases, the middle age group becomes the family heads, which in turn is reflected in our programmes.

Education :

A vast majority of the beneficiaries are illiterates and school drop-outs. This is due to lack of schools in their settlements. In the recent years, in spite of school facilities, the drop outs are more, due to their traditional wandering habits and lack of interest in pursuing studies.

Occupation :

The major occupation of these tribal families is collection of forest produce and agriculture. In the past these tribals were forest tribes depending mainly on the MFP (minor forest produces) available in the forest.. During the British regime, they had a lot of restrictions to go around in the forest and so they began small scale shifting cultivation. Latter on due to wild animal menace and growth of forest in their agricultural land, they were forced to go to the nearby estates as agricultural labourers. Now wherever land is assigned for the tribals, agriculture development programmes are being implemented and majority of the tribes are longing to do intensive agriculture.

Average family size :

About three fourth of the family had the average family size of between four and six persons. The average worker per family is two.

FARMERS' CATEGORY :

It is evident from the Table - 2 that there is an increase in the number of marginal farmers from 21 to 65 after adoption. This is due to the fact that the fallow land available with the families are brought under cultivation through Lab-to-Land programme. The land records for each family was obtained in the way of enjoyment certificate. Thus the agricultural labourers are subsequently transferred as marginal farmers.

FARMING SYSTEM :

The Lab-to-Land programme has influenced the beneficiaries to shift their cropping pattern from annual crops to perinnial ones.

As evident from the Table - 3, cropping patterns of the tribal community have changed from traditional cultivation of small scale annual crops to perennial plantation crops like tea, coffee, etc. In upland areas, cultivation of the high yielding tea (B/6/61 — UPASI-9) and in the mid elevation the cultivation of high yielding coffee ('cauveri') are encouraged. Nearly 50 per cent of the total area is adopted with coffee and 17 per cent of the total area under tea. The introduction of new varieties of mulberry MR-2, M-5 also aroused interest among the tribal families, especially for cultivation in the rocky patches, which occupies 24 per cent of the total area. The reason for the change of cropping patterns is due to the recurring loss in the cultivation of millets, wild animal menace etc; whereas in the plantation crops like tea, coffee, they get assured returns.

TECHNOLOGIES ADOPTED :

The technologies adopted by the tribals to improve their yield and return are given below :

1. **Tea cultivation :**

    * Introduction of hign yielding clonal tea (UPASI-9)
    * Adoption of proper soil and water conservation measures
    * Planting of clonal tea (UPASI-9) along the contour, with high density of plant population
    * Proper training of young tea
    * Application of optimum dose of fertiliser in splits
    * Liming and correction of zinc deficiency
    * Timely plant protection measures
    * Proper method of plucking.

2. **Coffee cultivation :**

    * Introduction of high yielding coffee variety 'Cauveri' in the mid and lower elevation
    * Popularising pepper 'Karimunda' clove and nutmeg as an inter crop in coffee plantations.
    * Raising of coffee and spices plants in the village community nursery.
    * Application of NPK mixtures in split doses.

3. **Sericulture :**

    * Introduction of high yielding mulberry variety MR2 and M-5

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- Raising mulberry saplings and proper method of planting
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- Rearing of chawki worms of Bivoltine and Multivoltine races of silkworm
- Marketing of cocoons.

CONSEQUENCE :

By the introduction of the high yielding varieties of tea, coffee and mulberry and the adoption of improved technologies, the tribal farmers got substantial net returns. The details on the economics of tea, coffee and sericulture are furnished in Table - 4. The table shows the positive attitudes of tribal farmers in adopting new crops and in their sector. The introduction of new technologies boosted the average yield of green tea leaf to 7500 kg per hectare. A tribal farmer with an average area of 0.4 ha. cultivation of tea enhanced an income of Rs. 9000/- per annum as compared with Rs. 8000/- in coffee and Rs. 7200/- in sericulture respectively.

For the landless agricultural labourers apiculture was found to be a good source for additional earnings. Although rabbit rearing was promising in the beginning, at a later stage, the multiplication capacity reduced considerably due to degeneration of hybrid stock and disease. Similarly, duck farming was also a failure at the later stage due to ageing of the birds and casualties due to viral infection.

Thus majority of the marginal farmers would like to continue tea and coffee cultivation with spices as inter crop. However, the sericulture and bee keeping are considered to be the promising enterprises in tribal sector.

STANDARD OF LIVING :

Having analysed a detailed data on the economic of their cultivation, it is necessary to give the variation of per capita income and expenditure.

The daily average income and expenditure pattern of each family was worked out. Based on the bench mark survey carried out in each village the per capita income and expenditure before and after adoption was worked out and presented in the table.

Table - 5 shows the daily average income and expenditure of the individual.

It is evident that before adoption, the average per capita income per day was only Rs. 8.80 as compared with the average expenditure of Rs. 11.70. Most of the beneficiaries earning was only through agriculture labour, but due to more expenditure, they were pushed to poverty and indebtedness.

After the adoption the average per capita income per day was increased to Rs. 16.40. This was slightly higher than their daily expenditure of Rs. 14.30.

It is significant to note that their average income has almost doubled (100 per cent) and their expenditure has increased by 22 per cent in respect of dressing habits, drinking and smoking habits, visiting relatives in the nearing villages, spending more on social functions, purchase of house hold articles etc.

With their increased income and expenditure, there was a tremendous change in the overall living styles of the beneficiaries.

SOCIO ECONOMIC CHANGES :

With the increased income remarkable changes were noticed in the area of cropping pattern, land value, mode of dressing, income, smoking and drinking habits etc. The details are given in Table - 6.

It is seen from the table-6 that over 90 per cent of the respondents had changes in their dressing habits, cropping and land value while 89 per cent in the income. About three fourth of them had changed with respect of the knowledge about farm technology, drinking and smoking habits and social contact. It is interesting to note that two third of them showed change in food system. Majority of the respondents have changed their consumption pattern from single meal a day, to twice or thrice a day.

The remarkable change in the mode of dressing is mainly attributed to their intention to dress like the people in the nearby towns and to live on par with them.

The introduction of appropriate technologies to tribals under LLP, changed their cropping pattern from the traditional way of shifting cultivation to perennial farming such as tea, coffee, spices and other crops like sericulture and vegetable cultivations. Almost 94 per cent of the respondents changed their cropping pattern. They have

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realised that the art of cultivating new and high yielding varieties of the parennial crops from an unit area of land is more profitable than cultivating the traditional millet crops. The reason may be that introduction of new varieties appropriate to the tribal vergin land significantly shows an average yield increase as compared to their traditional varieties.

The conversion from the traditional crops to perennial crops like tea, coffee etc. has resulted in higher appreciations of the land value. The land which was valued about Rs. 25000/- per hectare prior to the implementation of the programme has zoomed to Rs. 2 lakhs per hectare after the establishment of the plantation crops. The conversion from shifting cultivation to settled cultivation has provided regular income and permanent employment opportunity to the family members.

Addiction to liquor (76 per cent) smoking (79 per cent) is found to be on the increasing trend due to additional income they gained from settled cultivation. These areas gain attention of the researchers for further investigations.

The marketing system of the tribals has since been changed and now they sell their tea green leaf to the industrial co-operative tea factories and coffee to the Coffee Board and cocoons through Silk Board. Thus middlemen exploitation has been reduced to the maximum level after implementation of the programme.

Change in the way of life, investment and savings are significantly influenced under the programme. Construction and renovation of houses, purchase of household articles such as radios, watches are also noticed among the respondents.

With the low income they were once indebted to local money lenders and marketing agents but at present 27 per cent of the respondents are having savings in the banks, 19 per cent took LIC policy and 48 per cent (majority women) are engaged in community chit organised by their leaders of the village. The favourable investment pattern was noticed every week.

SUMMARY AND CONCLUSION :

The Lab-to-Land programme is the first line transfer of technology. This aims at bringing socio-economic changes amongst the poorest of the poor. The UPASI-Krishi Vigyan Kendra has implemented this programme for the first time in the tribal villages of the Nilgiris. The study was carried out in order to find out the impact of the Lab-to-Land programme among these tribal beneficiaries.

The study reveals that :

1. Among the beneficiaries, most of them are illiterate, middle aged with an average of 5 members per family with main occupation being Agriculture.
2. Forty four per cent of the Landless agricultural labourers gained their status as marginal farmers by cultivating their fallow land with plantation crops like tea, coffee spices and sericulture.
3. Subsequently majority of them switched over from annual crops like millets to perennial crops like tea, coffee, clove, pepper and nutmeg.
4. Cultivation of the high yielding varieties of tea, coffee have brought about a substantial changes in their regular income and employment opportunity.
5. Mulberry cultivation has been accepted as a promising enterprise in the lower elevation.
6. Agriculture has enabled the agricultural labour families to generate additional income. Enterprises like rabbit rearing and duck farming were not successful at later stages due to degeneration of hybrid stock coupled with disease problems.
7. The per capita income has been doubled after adoption while expenditure increased by 22 per cent.
8. With the increased income, a remarkable socio-economic change has taken place among the beneficiaries. The main areas are in the order of dressing habits, cropping pattern, land value, income, smoking and drinking habits, knowledge in farming technology, social contact, food habits and marketing system etc.
9. In their way of living, saving and investment are also noticed.
10. The research saught to determine that the future strategy should focus on the importance of

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rural education, training and management of rural human resources.

11. The linkage with other organisations, institutions and the leadership qualities among farm families need to be strengthened for an overall integrated development among the tribal families.

ACKNOWLEDGEMENTS :

The author is thankful to the Indian Council of Agricultural Research (ICAR) and the United Planters' Association of Southern India (UPASI) for financing and implementing the tribal projects. He is grateful to Mr. D. Ravindran, Secretary General, UPASI and Dr. V. Karupaiyan, Department of Anthropology, Madras University for their encouragement in this study. The author gratefully acknowledges Dr. V.G. Dhanakumar, Principal Scientist and Chief Training Organiser UPASI-KVK, Coonoor and Dr. Jakka Parthasarathy, Senior Lecturer, Tribal Research Centre (TRC), M. Palada, Udhagamandalam for their input on this paper. He is also thankful to Dr. V. Alagesen, Professor and Head, Krishi Vigyan Kendra, Tamil Nadu Agricultural University (KVK-TNAU) Virudha-chalam for his valuable guidance and help. The author is also thankful to Nilgiri Adivasi Welfare Association (NAWA) for fruitful collaboration. Thanks are due to their colleages for their help in preparing the paper and tribal families for their unstinted co-operation and support.

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TABLE - I : Profile of the respondents :

S.No.	Characteristics	Category	Per cent
i.	Age	Young below 35 years Middle 36 - 45 Old 45 and above	32 46 22
ii.	Education	Illiterate Primary School Middle School Secondary School Collegiate	72 12 9 7 Nil
iii.	Occupation	Marginal farmers Landless Agricultural labourers	65 35
iv.	Average family size	Below 3 4 to 6 Above 7	16 73 11

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TABLE - 2 : Category of farmers before and after adoption :

S.No.	Category	Before adoption (per cent)	After adoption (per cent)
i.	Big farmers	—	—
ii.	Small farmers	—	—
iii.	Marginal farmers	21	65
iv.	Landless agricultural labour	79	35

TABLE - 3 : Nature and Extent of land utilised :

S.No.	Crop	Before adoption (per cent) (Area 15.7 ha)	After adoption (per cent) (Area 72.4 ha)
i.	Millets	70	9
ii.	Tea	4	17
iii.	Coffee	26	50
iv.	Mulberry	—	24
		100	100

TABLE - 4 : Consequential changes with regard to yield and net returns :

S.No.	Particulars	Tea	Coffee	Sericulture
i.	Area covered	12.0 ha	36.4 ha	17.6 ha
ii.	Average Yield (kg/ha)	7500 of green leaf	1250	500 kg of cocoons
iii.	Average price (Rs/kg)	5	25	60
iv.	Gross income (Rs/ha)	37500	31250	30000
v.	Average cost of cultivation (Rs/ha)	15000	12500	12000
vi.	Net income Rs/farmer/annum (for an average of 0.4 ha holding)	9000	8000	7200
vii.	No. of workers employed per ha	3 w/ha	1 w/ha	2 w/ha

TABLE - 5 : Average per capita income and expenditure before and after adoption

S.No.	Adoption	per capita income	per capita expenditure
i.	Before adoption	8.8	11.7
ii.	After adoption	16.4	14.3

TABLE - 6 : Socio economic changes among tribes :

S.No.	Areas	Per cent
1.	Change in the dressing habits	93
2.	Change in cropping pattern	94
3.	Change in the land value after cultivation	93
4.	Change in their income	89
5.	Change in smoking	79
6.	Change in drinking habits	76
7.	Change in their knowledge about farm technology	74
8.	Change in the employment opportunities	71
9.	Change in visiting relatives in the neighbouring villages	71
10.	Change in conducting family functions	67
11.	Change in their food habits	65
12.	Change in seeing cinimas	65
13.	Change in the marketing system	64
14.	Change in sending children to school	60
15.	Change in contact with development dept.	47
16.	Change in religious activities	42
17.	Change in using medical facilities	35
18.	Changed way of living	
	- Construction of houses/ renovation of houses	39
	- House hold articles	43
	- Purchase of radios	34
	- Purchase of watches	26
19.	Change in investment and savings;	
	- Acquired more land for cultivation	18
	- Acquired more land for housed	14
	- Savings in the banks	27
	- Savings in the LIC	19
	- Savings in the village chit	48
20.	Change in the leadership pattern	17

MEETINGS

- Meeting of Secretary General with Secretaries of State Planting Associations : Coonoor : 13th April 1995.
- Coffee Committee Meeting : Bangalore : 15th April 1995.
- Rubber Committee Meeting : Kochi : 21st April 1995.
- Labour Liaison Committee Meeting : Munnar : 22nd April 1995.

EXIM POLICY

The revised EXIM Policy has been announced which will be effective from 1st April 1995.

An important development is the bringing of roasted or decaffinated coffee under OGL. This would mean that roasted coffee or decaffeinated coffee can now be imported without any quantity restriction and without any licensing. However, the effective rate of import duty will be applicable. The present rate of import duty in respect of coffee is 10 per cent. There is no change in respect of other plantation commodities.

Natural Rubber continues to be in the restricted list; whereby licence is required for import. The effective rate of importy duty has to be paid, which is at present 25 per cent. NR can also be imported under the following two routes.

a) Under Advance Licensing Scheme against exports. Raw materials required for export products can be imported duty free with certain quantity restrictions. Under the scheme NR can be imported duty free against export of rubber products.

b) Under the Export - Import Policy there is also provision for special import licences. Goods under this list can be imported only with a licence and import under this list will be subject to the import duty rates prescribed for each item, unless the Government specially exempts the product from the import duty. Special import licences which are transferrable, are issued under special circumstances and to large export houses enabling them to either import such goods or sell the licence at a premium.

TEA DEVELOPMENT ACCOUNT SCHEME

As per Section 33 AB of the Income Tax Act, upto 20 per cent of the profits from tea could be deposited with NABARD (which will be eligible for deduction from Income Tax); the deposit could then be withdrawn and used for purposes specified under the Scheme notified by the Tea Board. NABARD had been contending that as per their Act, there will be a lock-in period of a minimum of one year for the deposits. Since the issue could not be sorted out, by the Finance Bill, 1994, Section 33 AB was amended by which tea assessees were permitted either to make deposits with NABARD or under the provisions of a new Scheme that may be notified by the Tea Board. Accordingly, the Tea Board has now finalised and notified the Tea Development Account Scheme, 1994. The major difference is that deposits could now be made with the State Bank of India or any other scheduled bank. There are also a few minor changes by which the deposits could be utilised for a few more purposes than what were listed earlier. A detailed circular has been issued to the tea members.

MINI TEA FACTORY

The UPASI Mini tea factory at Coonoor has been put on operation and the training programmes started on 17th April. The trainees will be mainly from

Bought-Leaf/INDCO Factories and small growers and their dependants. The training will be for a duration of one week for those who are already working in tea factories and one month for those who have no previous experience in tea manufacture.

FREE SALE QUOTA

The Government of India has decided to grant 100 per cent Free Sale Quota (FSQ) for the 1994-95 season in respect of small coffee growers, whose holding is less than 10 hectares. The remaining growers will be allowed FSQ of 70 per cent which means that such growers would have to pool with Coffee Board 30 per cent of the crop.

Besides receiving the coffee into the pool, the Coffee Board will also undertake direct purchase of coffee at prevailing market prices. The Board will use the pool and purchased coffee for market intervention according to the needs of the situation. Coffee will be supplied through the Board's outlets. Some quantities of coffee will also be supplied to the Governments of the four Southern States for distribution.

It has also been announced that besides the Coffee Board's Auction Centre at Bangalore, the Board will recognise additional auction centres according to the needs of the industry. To begin with, Coffee Board will recognise the following centres which have come into being as a result of voluntary arrangements among the growers and the traders :

i) Indian Coffee Traders Association, Infantry Road, Bangalore.

ii) Coorg Coffee Growers Co-operative Society, Raja Street, Madikeri and at Hunsur, Karnataka.

iii) Mysore Coffee Curing Works, Kadur Road, Chikmagalur, Karnataka.

iv) Andhra Pradesh Forest Development Corporation, Gandhinagar, Vijayawada (AP).

COFFEE BERRY BORER

It is reported that the incidence of Berry Borer is very high in the coffee growing areas of South Coorg. The matter was brought to the notice of the Central Coffee Research Institute. Extracted below is the reply received from the Director, CCRI.

"Ever since the pest was detected at Gudalur during 1990, intensive and extensive campaign programmes were organised in the infested areas for making coffee growers aware about the pest and the measures to be adopted for its effective management. The control measures suggested, based on the experience in other countries as well as the studies conducted in our country so far are found to be very effective in controlling the pest. This was clearly demonstrated in the 37 control demonstration plots maintained by the Board in the three districts as well as in plantations where timely measures were adopted by the growers themselves. Our experience shows that adoption of cultural (phytosanitory) measures like timely and clean harvest, proper gleanings collection, etc., are the key factors in reducing the inoculum and further build up of the pest. This point is always stressed during all the campaign programmes like group gatherings, individual contacts, training programmes, publicity through mass media like Newspapers, AIR and Doordarshan.

The Board has provided endosulfan, the most effective pesticide against berry borer at 50 per cent subsidy to the needy small growers which helped them to take up spray in hot spot areas. This has contributed significantly in the containment of the pest.

Our efforts in the field of bio-control of the borer resulted in identifying *Beauveria bassiana* as a useful tool in the IPM. A number of field trials conducted in different areas using this fungal pathogen revealed that it can afford good control of the pest if it is applied at right time. A mass culturing-cum-training centre has already been set up at Siddapur to provide necessary training to the interested growers to take up culturing the fungus at estate levels.

With regard to the use of exotic parasitoids, the two parasitoids will be imported during September 1995 and the field evaluation could be done in the ensuing cropping season.

Due to the faster spread of the pest in Kodagu during the last two seasons more thrust was given in the campaign programme in this region. Research and Extension Wing in Kodagu region is continuously organising various campaign programme. In addition to this, major campaigns were organised depending on the flare up of the pest incidence. The latest major campaign programme was organised for a week during February 1995 in all the areas of Kodagu. During this programme, Research and Extension personnel visited almost all the pest infested villages and conducted group gatherings in strategic areas. It was observed during the survey that the pest has spread to more villages especially in Virajpet and Gonicoppal zones. As harvesting of robusta coffee was in progress during the period of survey, the growers were impressed upon the necessity of completing the harvest as early as possible to check the build up and spread of the pest. However, many growers expressed the inability to complete harvesting early especially due to labour scarcity coupled with good crop. It was also noticed that many growers transport coffee from infested to uninfested areas for drying purpose. This is a major reason for the spread of the pest to new villages at a faster pace.

The severe incidence of the pest, reported in robusta estates during this period of the season is due to the delayed harvest which provides an opportunity for the pest to multiply faster. Since the infestation concentrates in unharvested crop in a particular area the pressure of pest population on such crop will be higher. This will result in congregation of beetles, the presence of which could be felt more pronounced when compared with the condition of a normal level of infestation.

The campaign programme will be continued further to urge the growers to take up post harvest phytosanitory measures so as to reduce the pest inoculum for the next season. It may be pointed out here that implementation of these measures will not be successful without the sincere co-operation of each and every grower in the area. The efforts made by the Coffee Board in Byrambada Village was successful in motivating all the growers to take up control measures and thereby bringing down the pest incidence to a very low level from the severe incidence during the last season".

INDIGENOUS MEDICINAL PLANTS

A seminar on Indigenous knowledge of Medicinal Plants was organised by the UPASI KVK on 28th March. The main objective of the Seminar was identification, preservation and promotion of indigenous medicinal plants in the Nilgiris with the help of the tribal people. The Seminar was attended by over 120 tribal people from 15 villages.

WAGE ISSUES

Karnataka : In Karnataka, a three-year wage settlement has been entered into at the tripartite level revising the wages of workers in all crops with effect from 1st April 1995. Under this settlement, the basic wage of an adult worker in tea/coffee/mixed estates has been raised from Rs 19 to Rs 31 and that in rubber from Rs 19.75 to Rs 32 per day. The higher basic wage is equated to a higher level of CPI Numbers at 1394 points with a higher per point rate of 2.5 P. as against 976 points and 2 P. respectively under the Minimum Wage Notification over which the revision took place. By another bipartite settlement, which is valid for four years, the wages of non-staff were also revised with retrospective effect from 1st April 1994.

Kerala : In Kerala, after the expiry of the last wage settlement on 31st March 1995, a few rounds of discussions took place in the Plantations Labour Committee.

Tamilnadu : In Kanyakumari rubber plantations, the strike resorted to by the workforce was withdrawn consequent to a wage-dispute settlement reached, under which the workers received an ad hoc advance of Rs 4 per day, pending conciliation of the wage/D.A. issue.

LATEST WAGE RATES

Consequent to the adjustment of CPI-linked D.A. in Kerala and Tamil Nadu, the revised settlement in Karnataka, and the ad hoc advance in Kanyakumari, the wage rates from 1st April 1995 are :

	Adult Wage per day (Basic + D.A.) .... (Rs.)			
	Tea	**Coffee**	**Rubber**	**Cardamom**
Kerala	39.70	39.70	43.75	39.30
Tamil Nadu	39.76	39.76	41.64 + 4.00*	39.76
Karnataka	33.98	33.98	34.98	33.98

(* Ad hoc Advance over the wage as on 31.7.1993)

MEETING WITH THE UNION LABOUR MINISTER/ OFFICIALS

At the meeting held in Munnar on 22nd April with the Union Labour Minister Shri P.A. Sangma and Senior Government Officials, including Union Labour Secretary, Mr. S. Gopalan, Central Provident Fund Commissioner, Kerala Labour Secretary, Karnataka Labour Commissioner etc., issues like the pending Plantations Labour (Amendment) Bill, 1992, medical/ housing facilities under the P.L. Act, restriction of maternity benefit to two child births, workmen's Compensation (Amendment) Bill, 1994, minium wages etc. were taken up, followed by a presentation.

PERSONALIA

Smt. J. Lalithambika, Chairman, Rubber Board is taking over as the Secretary General of the Association of Natural Rubber Producing countries, Kuala Lumpur, Malaysia.

✪ ✪ ✪

Shri R. Chandrashekar, IAS, has taken over as Joint Secretary (Plantations), Ministry of Commerce, Government of India.

✪ ✪ ✪

Shri Bhubaneswar Kalita, Member of Parliament has been elected as Vice-Chairman of the Tea Board for holding office for the period from 1st April 1995 to 31st March 1996.

PRICE TREND (Rs./Kg.)

CROPS	LATEST		6 MONTHS AGO		YEAR AGO	
TEA	C.T.C.	ORTH.	C.T.C.	ORTH.	C.T.C.	ORTH.
COCHIN	41.14	42.26	35.04	39.23	34.93	34.07
COIMBATORE	34.90	42.75	32.06	41.23	29.00	31.33
COONOOR	36.04	30.98	25.76	30.40	27.12	27.38
AVERAGE	38.24	39.40	30.52	37.82	30.81	31.77
COFFEE						
a) **Private Auction**						
PLANTATION A	118.24		122.00		53.26	
ARA. CHY. AB	101.45		114.92		47.97	
ROB. CHY. AB	95.86		103.18		42.97	
b) **Coffee Board Auction**						
PLANTATION A	98.40		126.60		49.23	
ARA. CHY. AB	96.84		118.06		42.88	
ROB. CHY. AB	92.16		106.10		37.33	
RUBBER						
a) **Kottayam**						
RSS LOT	53.50		32.00		25.70	
RSS IV	54.25		33.75		26.50	
b) **Kuala Lumpur**						
RSS I	58.06		39.83		28.95	
SPICES						
CARDAMOM	237.54		315.27		309.80	
PEPPER	87.50		79.50		47.75	
CLOVES	91.00		95.00		82.00	
NUTMEG	98.00		105.00		85.00	

TEA CROP - SOUTH INDIA

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1995	:	13,430
1994	:	15,371
1993	:	15,002
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1995	:	34,344
1994	:	43,505
1993	:	33,491

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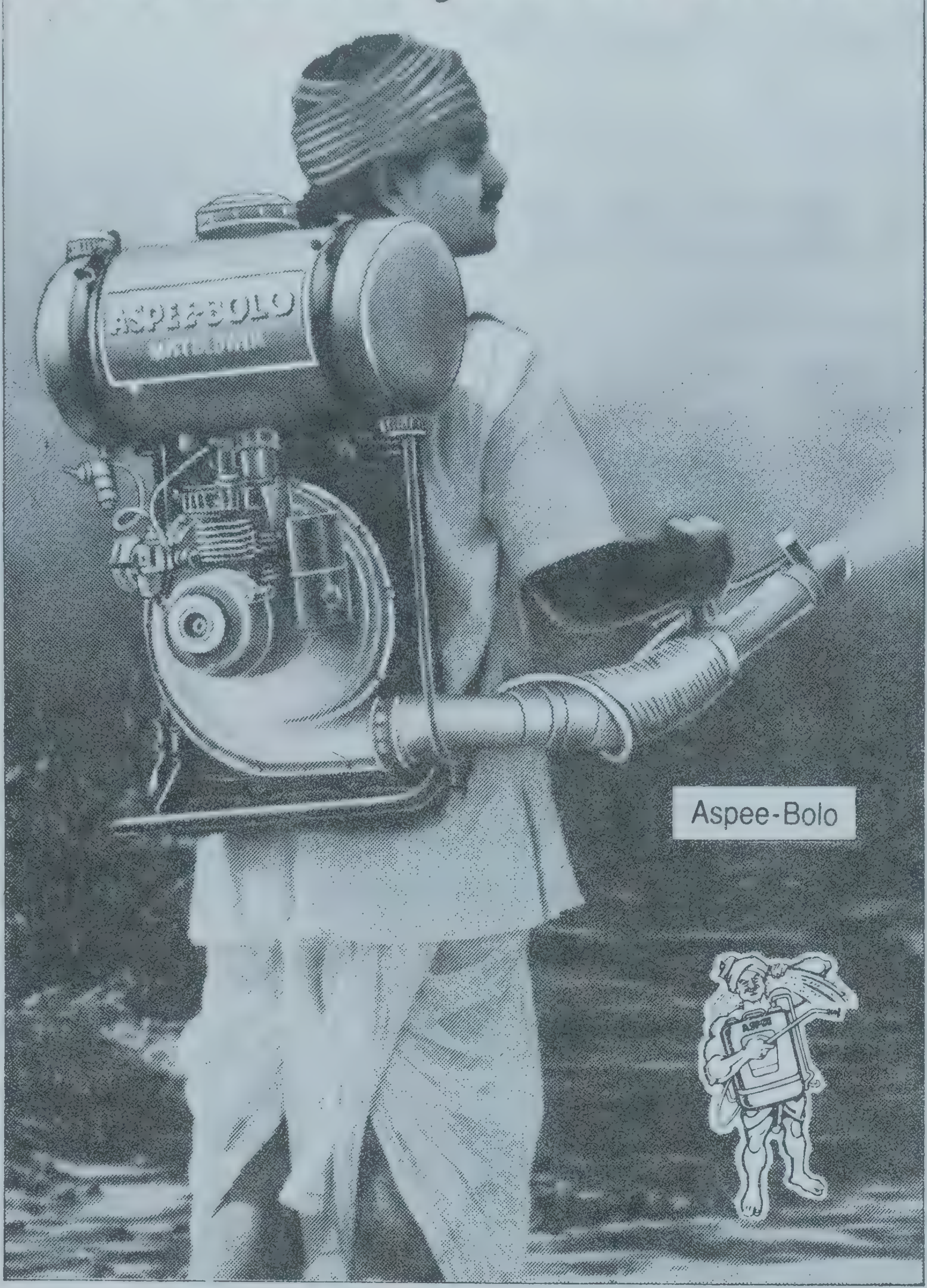

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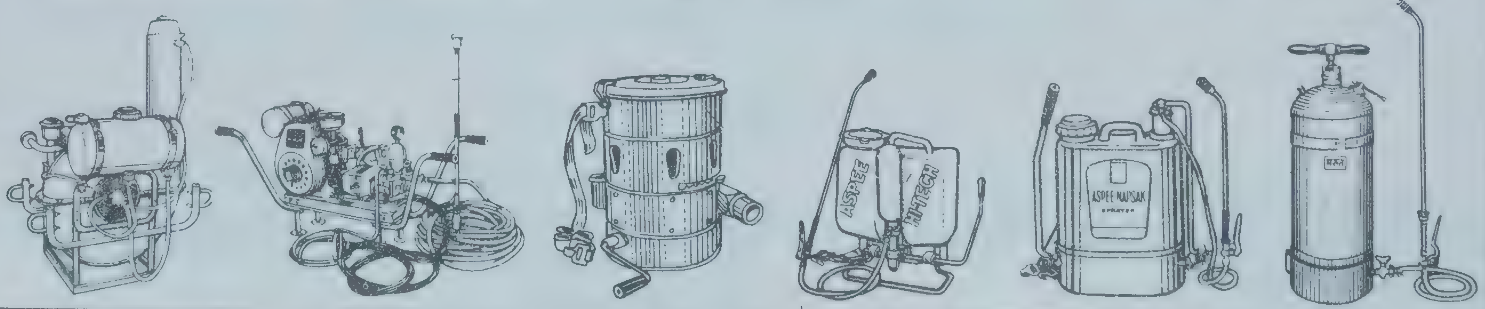

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NATURAL RUBBER PRICE

In 1994-95 on a production of 4.37 lakh tonnes of natural rubber in Kerala with an average price of Rs 36,000 per MT, the income to the people of the State from sale of rubber was Rs 1,400 crores in a year. Income to the State Government from Purchase Tax was Rs 150 crores in a year. With over 83 per cent of the rubber production coming from small growers, natural rubber is predominantly a small grower crop. There are 8 lakh rubber growers. Taking an average family size of 4, this would mean 32 lakh people in the State directly dependent on natural rubber, not taking into account people involved in allied activities, such as, dealers, staff employed, etc.

Due to the price increase in 1994-95 compared to the price prevailing in the earlier year, the rubber growers have got additional Rs 485 crores in one year.

And lastly, it should be noted that rubber production is confined to a few districts in the State only.

The above facts are quoted to indicate the importance and also evocative nature of the rubber price issue to the rubber growers in Kerala and also to the State. The price issue is all pervasive. It is both economic as well as emotional.

The price increase on natural rubber during the last 18 months or so has been decried by the rubber consuming industry. On the other hand, rubber growers ask the following questions :

— When there has been tremendous surge in price of various commodities and manufactured goods during the last few years, what is so peculiar about the price increase on natural rubber?

— When the domestic price is still lower than the international price, how could the domestic price be labelled as on the high side?

— Should not the grower get a return for the opportunity cost of land used for rubber cultivation (return on the market value of land)?

— Rs 24.90 per kg was fixed as the fair price by Government over two years back. There has been tremendous increase in cost of production during the last two years. Without taking into account this aspect as well as the opportunity angle, is it fair to compare the market price with the fair price fixed?

— It takes about 7 years from planting to start yielding in the case of rubber tree. During that period the rubber growers have to exist on meagre subsidy given by Rubber Board. While considering the present level of price, this fact can't be overlooked.

None of the above arguments can be brushed aside. There is also the angle of good price level for natural rubber leading to expansion of area of rubber cultivation. To catch up with the demand growth for natural rubber, it is necessary that both productivity and area of production are increased.

From the point of view of creating surplus for export also, production has to increase. If there is no good profit, why should anybody take up rubber cultivation?

✪

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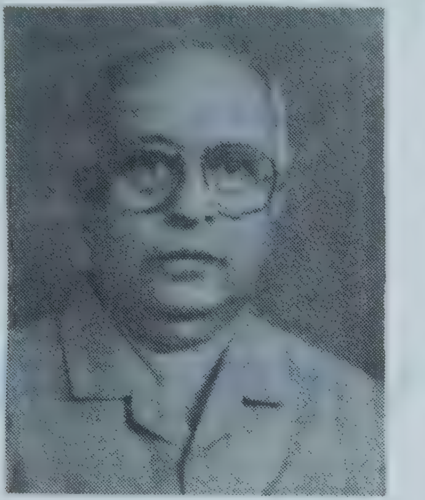

NATURAL RUBBER :
WHAT THE FUTURE HOLDS

P.K. MADHAVA MENON

CHAIRMAN,
UPASI RUBBER COMMITTEE

YEAR	CONSUMPTION RATIO			
	WORLD		INDIA	
	Natural Rubber %	Synthetic Rubber %	Natural Rubber %	Synthetic Rubber %
1950	74.8	25.2	NOT AVAILABLE	
1960	54.1	45.9	87.3	12.7
1970	34.7	65.3	72.9	27.1
1980	30.0	70.0	78.8	21.2
1990	34.9	65.1	79.6	20.4
1994	38.6	61.4	80.3	19.7
1995 (Proj.)	38.8	61.2	80.5	19.5

In the euphoria of attractive price for natural rubber during the last few months, in the surcharged atmosphere of accusations and counter accusations of whether the current level of price is justified or not, the quantity of rubber to be allowed to be imported and the licensing mechanism for import becoming debatable issues, understandably there is reluctance to peep into the future.

Future is always uncertain. There are many imponderables. In a dynamic situation, as in rubber, often event overtake projections. Slow down of economy, particullary the automobile sector or higher usage of synthetic rubber in place of natural rubber could lead to lower demand for rubber. Conversely higher GDP or industrial growth in some of the rubber producing countries leading to reduced rubber cultivation / abandoning rubber plantations as has been happening in Malaysia, resulting in olwer availability of rubber related to demand would ensure the present level of price continuing or may lead to further upsurge in price.

WHAT ARE THESE FACTORS?

1) By far the most crucial factor is the ratio of consumption or usage of natural rubber to synthetic rubber.

Points to be noted :

(a) The ratio of consumption of different rubbers in world and India is just the reverse of each other

(b) In both cases the ratio has remarkably remained steady, though with technological progress, change in materials used for production, price competitiveness, etc., change in the ratio in future cannot be completely ruled out. Yet the probability of change is very little, considering the past trend.

(c) There has been ongoing research, on how to increase the use of each rubber or rather cut into each other's use area. This is more so in the case of synthetic rubber, since synthetic rubber production is largely in the developed countries, whereas natural rubber production is entirely in the developing countries.

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(d) Will the continuing research lead to invention of a synthetic rubber with the intrinsic qualities of natural rubber, is a moot question?

(e) Degrading factor. Presently in the natural process both rubbers take time in degrading. Chemical degrading is so far a costly process. With environment enthusiastics crying foul, fruitful research in faster degrading of one type of rubber will give an edge to it, though this will not be a decisive factor.

(f) Comparative price level. To a large extent this will always be a decisive factor, limited by technological factor. To some extent both rubber usage could be inter changed, though there will be some compromise in the attributes of the final product. The pay off will be the determining factor. For example, tyres. Some interchangeability is a feasible proposition, from technical angle.

(g) Oil price level, which has a high bearing on the synthetic rubber price, is another angle.

(h) Exchange rate fluctuation would change the price ratio of the two rubbers, given largely the geographical production profile of both rubbers.

(i) And lastly, the projections of production and consumption in the years ahead of both rubbers would, to the extent of variance between actuals and projections, have a large say in both interchangeability and price levels of both rubbers.

It is difficult to assign inter-se weightage to the above factors in determining the future usage pattern of both rubbers. Yet a look at the above areas would help us in better understanding of the shape of future so far as natural rubber is concerned.

VERSATALITY :

So far natural rubber has been holding its head high in its competition with synthetic rubber. Versatality of natural rubber, particularly its heat resistance attribute, is the key factor. Of course, synthetic rubber (poly-butiedne rubber) has replaced natural rubber for the manufacture of inner tubes of tyres. A variety of synthetic rubber is now being produced with characteristics akin to that of natural rubber. Whether a synthetic rubber which could completely replace natural rubber would be invented is only time will tell. It is said that the sudden high upward movement of price of natural rubber would wide during the last one year and the projection of natural rubber price remaining at the current level in the immediate future are propelling giant rubber consuming companies and reserch institutions to do intensive research on finding a substitute. This has to be considered in conjunction with the oil price level likely to prevail and also the moment against pollution both of which are part of synthetic rubber manufacture.

CONSUMPTION RATIO :

It would be noted from the above that the ratio of consumption of both rubbers in India is just opposite to the position obtained-in the world. This is because of three reasons.

(a) In a tropical country like India performance of natural rubber is generally better than synthetic rubber,

(b) Natural rubber is the preferred choice for truck and bus tyres, whereas synthetic rubber is the choice for car tyres. In tonnage, production of truck tyres is much higher than car tyres in India whereas the reverse is the position in the developed countries, and

(c) The high price of synthetic rubber compared to natural rubber in India till a few months ago lead to cost factor tilting in favour of natural rubber.

Production levels of major natural rubber producing countries during the last few years are given below :

Countries	1991	1992	1993	1994
	.... ('000 tonnes)			
Thailand	1341	1531	1570	1870
Indonesia	1284	1387	1301	1413
Malaysia	1256	1217	1075	1020

It would be seen from the above that there is drastic cut in the production of natural rubber in Malaysia. Reports indicate that with rapid industrial progress in that country, workers are migrating from rubber plantations to industrial centres. Even with the jump in the price of natural rubber, there are no indications of production of natural rubber in Malaysia increasing. It is possible that with both Thailand and Indonesia witnessing high GDP growth, Malaysian development may be reapeted in these countries.

INDIA'S POSITION :

The position in respect of India is quite different. The Rubber Board had projected production of natural rubber going up from 1994-95 level of 472,000 tonnes to 650,000 tonnes in 2000-01. Further the Board has estimated demand growth to reach 200,000 tonnes by 2000-01 indicating a deficit in production of 50,000 tonnes related to demand. However, one should not read too much into this as with integration of Indian economy with world economy taking place, there would be free export and import of most of the commodities including rubber in a few years of time. The point that is being made is that contrary to the position obtained earlier of internal deficit leading to firm market price, the position could very well be different by 2000 AD.

What appears to be obtain is that for one or two years at least there is unlikely to be any downward swing of natural rubber price in the Indian market.

Increase in the price of natural rubber during the last one year is not free from fall outs. Yes, the price has brought prosperity to rubber cultivators and companies engaged in the production of natural rubber. With the price prevailing below and at par of cost of production for years together, this change in price level indeed is a deserving trend, so far as the producers are concerned. Yet, it would be unwise not to look at the other side of the coin. Wages tend to go up with the price increase. Producers take the current level of price granted when the price remains at this level for some time. In other words, the current level of price would be taken as the justified level. When producers get adjusted to the current price level, any dip if happens would be unacceptable. Learning to live with such a dip would be intolerable.

ECONOMIC SCENE :

The general phenomenon prevalent in the Indian economic scene, is for the prices to invariably chase the production cost increases. Cost plus was the universal approach which is now changing to cost plus and what competitors offer and consumer can afford. Negativating cost hike through quality upgradation is not given its due importance. Hence, except in the case of a few electronic items, the prices go up. Even where the productivity has gone up, the approach is not to absorb production cost increase and maintain price but to profit from productivity increase.

The issue of what a buyer can pay is seldom given any thought. Affordability is not a point of consideration at all. Yet, it is a fact that inexhorable forces of market economy, limits of purchasing power, low priced imports, etc. should lead producers to think in terms of what the buyer or market can afford.

True, it would be somewhat invidious to single out rubber production / cost / price and apply the above yardstick when in India these vital angles are often overlooked by all segments. Yet, the fact remains that this is an important aspect and needs unemotional consideration.

FOCUS ON NR

NATURAL RUBBER :

WORLD BANK ASSISTED PROJECT

P. MUKUNDAN MENON

Project Co-ordinator of
Rubber Board for World Bank Assisted Project

The spectacular growth achieved in natural rubber (NR) production in India has helped to reduce the demand supply gap of the vital industrial raw material from an average 25 per cent in 1960s to 3.5 per cent during the last four years. None the less, sustainable self reliance is nowhere in sight. While the industrial requirements will go on burgeoning, domestic supplies will not possibly keep pace owing to inherent limitations that go with the land based and labour intensive character of the plantation sector.

India's industrial use of NR in 1994-95 was of the order of 483,000 tonnes while indigenous production came upto 472,000 tonnes. The forecasts of future requirements, availability and deficits are as shown below :

Year	Requirements (tonnes)	Availability (tonnes)	Deficit (tonnes)
2000-01	700,000	650,000	50,000
2010-11	1,200,000	900,000	300,000

The outlook holds forth a loud and clear message. Constraints notwithstanding, efforts should be redoubled to maximise NR production.

The alternative to raising NR output is stepping up production of synthetic substitutes. There are, however, severe limitations in this direction too in view of the enormous quantities of scarce petrochemicals and energy inputs required and large scale environmental pollution that will have to be contained. Production of sophisticated varieties of synthetic rubbers involves import of tightly held foreign technologies. The situation being such, the cost competitiveness of synthetics has also become a thing of the past.

STRATEGY FOR DEVELOPMENT

The changing structural features of rubber plantation industry hold an important key to the success of planning for its development. Rubber cultivation has, by and large, come to be a small holder enterprise. With an average size of half hectare each, small holdings numbering about 850,000, contribute 85 per cent of the total area of 510,000 hectares under cultivation and account for 84 per cent of total production. There are only about 300 large estates having extents of more than 20 hectares. Land ceiling laws coupled with those for forest conservation and protection shut out possibilities for any significant expansion of area under estates.

Taking the above distinctive features into consideration, the development strategy evolved for rubber plantations lays emphasis on expansion of cultivation in holding sector both in traditional and non-traditional areas, timely and systematic replantation of old and uneconomic areas and improvement of yield of existing mature fields. Equally important is the acknowledged need to upgrade the quality of small holder rubber which accounts for the bulk of production.

NEED FOR CREDIT SUPPORT

Financial resources available with the Government are inadequate for promoting development of rubber plantations on the required scales. As per provisions of the Rubber Act, the Rubber Board's activities are to be

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financed out of rubber cess fund. For the last about 10 years, the accruals to this fund had not been adequate to meet even half of Board's expenditure. Revision of statutorily fixed cess rate was long overdue and an amendment to the Rubber Act raising the ceiling on cess from 50 Paise per kg to Rs. 2/- was approved by the Parliament only recently. Since then, the cess is being levied at Re. 1/- per kg. The full benefit of the revision will be realised only after some more time. To tide over the crisis that prevailed in 1990-91 and immediately thereafter, the Government of India sought assistance of the World Bank for implementation of a comprehensive development project. This resulted in sanction of a credit of SDR 66.4 million (SDR stands for Special Drawing Rights which is worked out as a basket of mixed currencies), equivalent of US $ 92 million or Rs. 290.08 crores. The amount is granted as soft loan or credit by International Development Association (IDA), the soft lending affiliate of the World Bank.

PROJECT OBJECTIVES

The project is conceived as a time slice covering the period 1993-94 to 1997-98 of the long term development programme of the Rubber Board and the Government of India. Its main objectives are to expand and strengthen the rubber plantation sector to increase production and productivity, improve processing and increase on-farm and off-farm employment. Additionally, the project aims at strengthening Rubber Board's research, extension and training activities.

PROJECT AREA

The project is being implemented mainly in Kerala, Kanyakumari District of Tamilnadu and Tripura. 2,000 ha of new plantations are also being raised in selected non-traditional areas other than Tripura, namely Karnataka,. Assam, Meghalaya and Nagaland.

PROJECT DESCRIPTION

The main components of the project are :

i) Replanting of old and uneconomic rubber in 40,000 ha in traditional areas.

ii) New planting in 30,000 ha consisting 23,000 ha in Kerala and Tamilnadu, 5,000 ha in Tripura and 2,000 ha in other non-traditional areas.

iii) Productivity enhancement in 60,000 ha of mature areas of small holdings in traditional areas through adoption of improved agro-management and exploitation (Discriminatory fertiliser application, plant protection, scientific tapping, rain-guarding and chemical stimulation of yield on older trees).

iv) Establishment of expanded and improved processing facilities.

v) Institutional support for Rubber Board for project co-ordination, research, extension, training and technical assistance.

vi) Development of women and tribal people amongst participating populations, particularly in Tripura.

REPLANTING AND NEW PLANTING

Replanting and newplanting of rubber are being promoted through grant of technical and financial assistance under a revised Rubber Plantation Development Scheme (RPD Scheme - Phase IV). The following are the salient features of the revision.

i) The existing planting grant of Rs. 5,000 per ha is raised to Rs. 8,000 (Rs. 2,500 in the first year, Rs. 1,500 in the second year and Rs. 800 each in the subsequent five years). In Kerala and Kanyakumari District, the eligibility for planting grant is to small holders owning upto 5 ha of rubber and undertaking replanting/newplanting upto 2 ha under the scheme.

ii) Additional assistance for use of polybagged plants of advanced growth @ Rs. 6 per plant successfully established in

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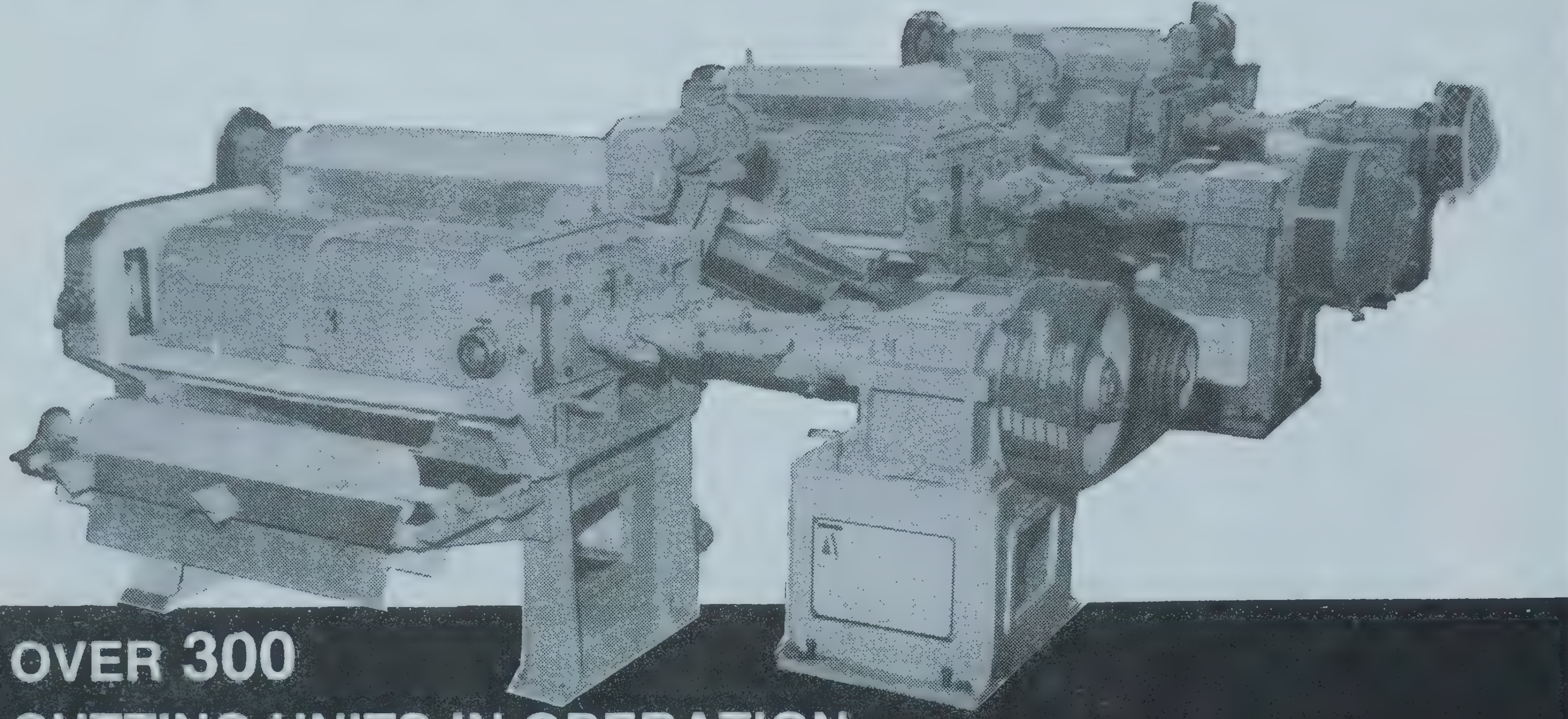

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the field for all categories of growers. However, the maximum number of plants that can be used per ha has been raised from the earlier 450 to 500. Accordingly, the maximum limit of assistance has gone upto from the earlier Rs. 2,700 to Rs. 3,000 per ha.

iii) Insurance protection against natural calamities is obligatory for the entire immaturity period. The premium due at Rs. 500 per ha is being deducted from the first year's instalment of planting grant.

iv) Free extension service.

PRODUCTIVITY ENHANCEMENT

The productivity enhancement programme will progressively cover more than one lakh growers. In order to reach and service them effectively, the programme is implemented through their own registered voluntary organisations known as Rubber Producers' Societies (RPS) whose strength of 1,300 at project start is being increased to 3,000 covering in all about 300,000 growers. The benefit of price concessions on inputs is kept on a declining basis from the first to the fifth year of the project. On an average the benefit derived on a per hectare basis is about Rs. 950/-.

PROCESSING

The project envisages making available a line of bank credit to finance establishment and/or upgradation of processing facilities, mainly in the private sector. Tentatively, there will be 3 new latex centrifuge factories, expansion of 25 latex centrifuge factories, establishment of 10 numbers of 15 tonnes per day block rubber factories, 30 numbers of ½ tonne per day smoked sheet factories, improvement/upgrading of facilities in 7 existing block rubber factories and conversion of 5 existing crepe factories to 10-12 tonnes per day block rubber factories. Additionally, the project will finance 5 rubber wood processing factories and one factory for production of the innovative pre-vulcanised latex. The programme is flexible in order to accomodate changes needed in the number of factories as per assessments made from time to time. Accordingly, as per present indications there may not be any need to set up new latex centrifuge factories. Engineering and other supporting services required by the entrepreneurs will be extended by the Rubber Board.

WOMEN AND TRIBAL DEVELOPMENT

The project will ensure larger involvement of women and tribal people in planting activities and would assist them in engaging themselves in income generating activities such as inter-cropping, horticulture, fish farming etc. This project activity would receive emphasis mainly in Tripura. The services of selected Non-Governmental Organisations (NGOs) would be enlisted to make this a success.

STRENGTHENING INSTITUTIONAL SUPPORT

For the successful implementation of the project, the Rubber Board's personnel and technical capabilities are being strengthened and improved. Research, extension, training, processing and project co-ordination, monitoring and evaluation are the key areas receiving attention in this regard. A number of new research schemes are slated to be undertaken keeping in view short term as well as long term requirements.

PROJECT COSTS AND FINANCING

Total project costs for the five year implementation period are estimated to be Rs. 445.20 crores as per details presented below :

	Project activities	Estimated costs (Rs./crores)
1.	Replanting & Newplanting	185.86
2.	Processing	46.11
3.	Productivity enhancement	58.58
4.	Research	8.96
5.	Extension	5.07
6.	Training & technical assistance	6.34
7.	Rubber Board organisation including project co-ordination	5.76
8.	Women and Tribal development	5.46
	Total baseline costs	322.14
	Physical and price contingencies	123.06
	TOTAL	445.20

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The IDA credit of SDR 66.4 million (US 92.0 million equivalent) would finance about 68 per cent of the total project costs, net of taxes and duties. Out of the total credit of Rs. 290.08 crores, the Government would provide Rs. 116.20 crores to the Rubber Board as grants and lend the remaining Rs. 173.88 crores to NABARD in accordance with standard arrangement for development assistance. Out of the funds ear-marked for NABARD, about Rs. 124 crores is for credit financing replanting and newplanting and the balance for processing. The Government of India has to bear the foreign exchange risk. The credit covers project expenditure incurred from April 1, 1993.

REPAYMENT OF THE CREDIT

The credit carries a commitment charge of ½ per cent on the principal amount not withdrawn from time and a service charge at ¾ per cent on the principal amount withdrawn which are standard terms for such credits. The principal is to be repaid in semi-annual instalments due on each June 1 and December 1 commencing from December 1, 2002 (after 10 years) and ending June 1, 2027 (after 35 years). The repayment rates for the period 2002 to 2012 will be 1½ per cent of the principal per instalment and thereafter 2½ per cent per instalment.

PROGRESS IN IMPLEMENTATION

Initial delays and teething troubles notwithstanding, the project is progressing well in its implementation. The planting targets for the first two years in the case of newplanting are being fully achieved. There are marginal shortfalls in replanting which have to be made good during the course of the remaining three years. Productivity improvement programme for small holdings has been scheduled to operate for five years from 1994-95. This is proceeding smoothly and, as far as it can be assessed now, effectively enough.

The progress of rubber and rubber wood processing programme requires to be watched. Establishment/improvement of factories require heavy investments and therefore cals for careful planning. The project offers toenterpreneurs only bank credit and technical support. In the circumstances an impressive participation cannot be expected in the initial stages. It is, however, expected that response will pick up adequately in the years to come.

Institutional strengthening required for proper implementation of the project has been undertaken and completed to an appreciable extent. These included opening of additional regional offices and field offices for the Rubber Board, increasing strength of personnel in key areas, providing overseas training to senior scientific and technical staff in subjects relevant to project implementation, availing technical assistance from experts from within the country and abroad in specialised areas, getting a development unit established by Tripura Government for local implementation of tribal and women development etc. Steps are afoot for establishing a training institute attached to the Rubber Board for imparting comprehensive training to rubber growers, plantation executives, processors, small scale rubber goods manufacturers, workers requiring specialised skills in rubber cultivation and production and Board's own personnel. Specialist Consultants engaged in this behalf are now preparing a long term training plan for the purpose.

Besides infusing the much needed development finance for all round expansion and modernisation of the rubber plantation sector, the World Bank Assisted Project is enabling the Rubber Board to make use of the best available external expertise for meeting the research and development imperatives of the industry. These should prove to be of immense assistance for upgrading the industry's abilities to meet future demands in production and quality standards. ✪

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NATURAL RUBBER : BRIGHT FUTURE

P.K. NARAYANAN

Rubber Production Commissioner (Retd.)
Rubber Board

One kilogram of natural rubber is Rs.62! Sounds unbelievable, strange and odd! Is it not? well, it is a reality to be reckoned with, may be so, for many more years to come. Those who agitate in front of the Rubber Board whenever rubber prices used to show a downward trend or when a speculative news item on possible rubber imports appears in the mass media, had at best demanded only Rs. 35 a kilo, which according to them had included a reasonably good reducable margin for negotiated settlement. These agitators are now conspicuous by their absence from the scene and are eloquently silent, obviously due to guilty conscience. The fortunes of the rubber plantation industry would have been still brighter, had it not been for the antipropaganda unleashed against rubber promotion by a section of the so called "saviours of the rubber growers" 2-3 years ago when there was a short-lived recessionary trend in the rubber market. The damage done was enough to dishearten the rubber growers inhibiting them from caring for their rubber trees. The cumulative effect of this set-back will linger on for some more time and the farmers are the losers.

Rubber is a vital and strategic raw material, unique in many respects. It has been found irreplacable. May be this is why natural rubber has been defined as "nature's most versatile vegetable product" decades ago. It continues to be so despite the emergence of several synthetic polymers. It will continue to reign supreme, during war and peace, remaining integral in modern sophisticated life.

FACTS AND FIGURES

Rubber is one of the very few agricultural commodities in India which has registered impressive rate of growth in all fronts in recent years as could be seen from the following statistics :

	1980 - '81	1994 - '95
Area under rubber	2,75,000 ha	5,20,000 ha
Production	1,56,000 Tons	4,72,000 Tons
Yield Per hectare	750 kg	1, 270 kg
Price per kg	Rs.12/20	Rs.57/-

Though there had been a quantum jump in production and productivity, the demand for rubber has been consistently outstripping supply, on account of the higher rate of growth achieved in consumption. India (with the exception of Brazil and China) is probably the only country which has the industrial capacity to consume more rubber than what is produced at home. This trend is sure to continue in all likelihood.

Therefore, the need of the hour is to make the country self-sufficient in natural rubber, more so, in view of the continuing deficit for this material the world over.

TECHNOLOGY GAP

At the annual session of UPASI at Coonoor in 1994, a presentation made by Sri. O.T. Jayachandran, Vice President (Plantations) of M/s. A.V. Thomas and Company made a starling revelation that the wonder clone RRII 105 developed by the Rubber Research Institute of India had yielded as high as 3620 kg/ha per year in one of their estates. If this is the realisable yield per hectare, the average national output per hectare in India is as low as 1270 kg/ha. Though this figure of 1270 kg/ha/year is the highest average yield achieved in any rubber producing country in the world, the fact remains that this is only around one third of the realisable yield. The gap between the "realised" and the "realisable" is often reffered to as

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the "technology gap". This could be bridged only through the continuous adoption of appropriate technology for which the planting community should be alerted. Efforts in this direction are sure to yield positive results in view of the highly remunerative prices prevailing now for various grades of rubber in the domestic market.

Besides, trying to produce more from existing holdings, the programmes for vigorous adoption of replanting and new planting will also have to be further intensified.

STATISTICAL PROJECTIONS

Statistical projections made by the Rubber Board a few years ago indicate that by 2000 AD India would need around 7 lakh tons of natural rubber. This figure would sound pretty low and outdated in the light of the intensive efforts of the Goverment to widen the areas of economic liberalisation, globalisation and privatisation. Tyre exports this year is expected to touch value worth 1000 crores of rupees. Non-tyre sector also is poised for significant growth. All these points to the fact that the demand for natural rubber by 2000 AD will be much more than 7 lakh tons. More so, with the consistent boom exhibited in the automobile sector.

Plantations which would yield in 2000 AD are the ones planted up to 1993. Even if the efforts to maximise production of rubber and further intensified, at best by then, rubber production in this country is not likely to go beyond 6.5 lakh tons, leaving a sizable deficit, which could be put at around 1.5 lakh tons.

Estimated demand during 2010 AD is worked out as 12 lakh tons. This figure also would need an upward revision. Unless an area of 4-5 lakhs of hectares are newly brought under rubber from now onwards till 2003, the deficit for natural rubber in this country would be over 2 lakh tons.

FUTURE ROLE

India has been a net importer of natural rubber all these years except for brief spells in between. The present shortage for this commodity within the country also warrants import of some quantity of rubber to which the producing interests also are agreeable. The Government had acted fast on the demand of the consumers of rubber (as usual), but where is the rubber? Even if it is available abroad at what price? Rubber prices in the international market has been ruling higher than the Indian Price for quite some time, which has never happened in the past.

Why this is so? It is the result of the interplay of a variety of factors which could be summerised as shown below :

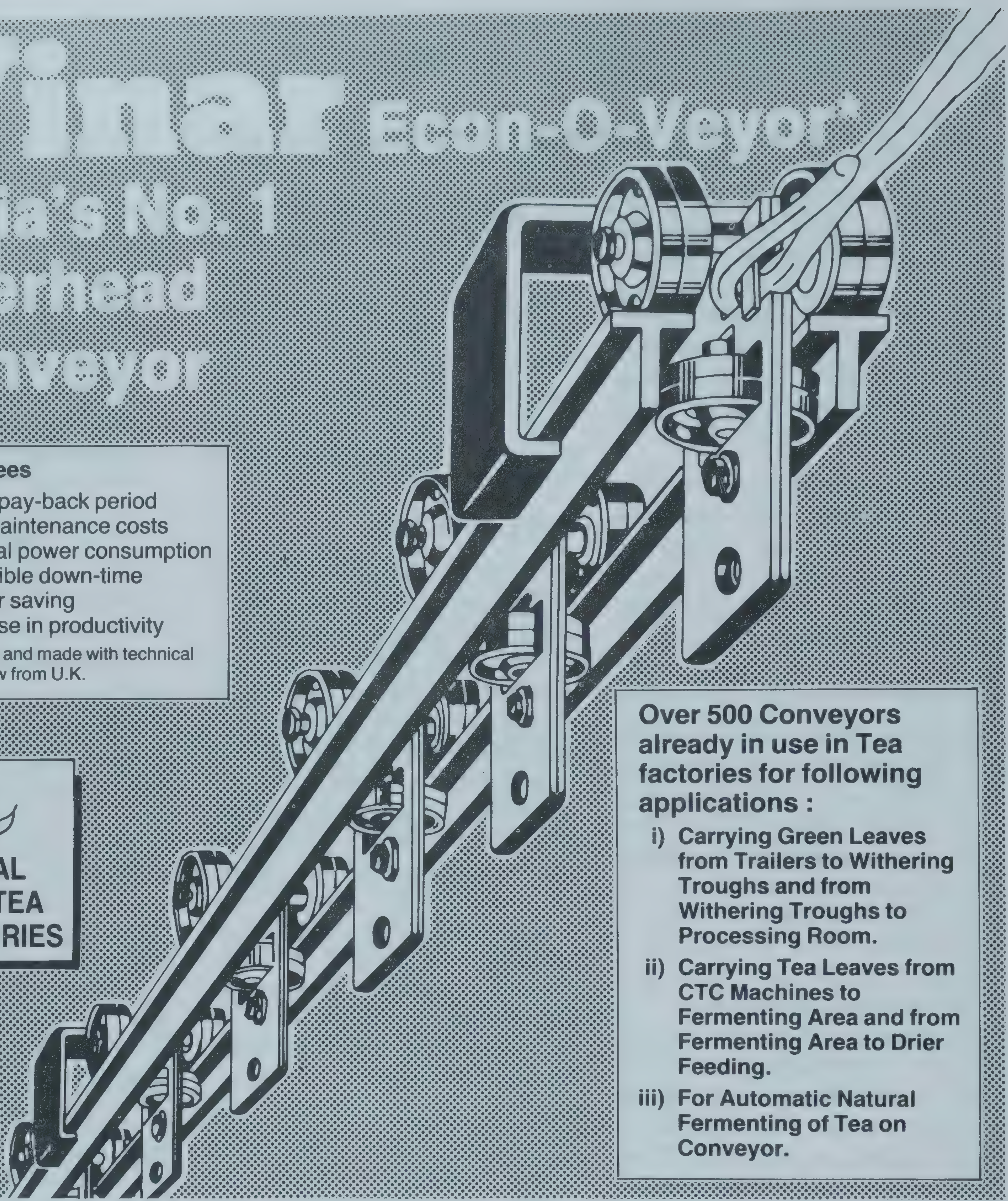
1. Something like 5 lakh hectares of mature area under rubber is kept untapped in Malaysia, as a result of which the arrival of around 6 lakh tons of rubber to the international market has been blocked.
2. Countries like China, Korea and Japan are on a buying spree for natural rubber which has made this commodity dearer causing unprecedented skyrocketting of rubber prices in the international market.
3. The world over the tendency to go in for natural products is gaining momentum. Most of the developed countries have started reducing the offtake of synthetic polymers and increasing the share of natural rubber. The NR : SR consumption ratio which stood at 20 : 80 a couple of decades ago has got altered now to 38 : 62. The transformation has resulted in considerable increase in consumption of natural rubber.

The cumulative effects of all these factors put together caused acute shortage for natural rubber globally and the resultant rise in prices. As the price in the international market ruled much higher than the Indian prices, rubber imports to India became almost impossible, because the landed cost of the material would be at least 25 per cent higher than the domestic price while accounting for the import duty, transportation etc.

For a few years to come this trend will stay. Therefore, unless concerted efforts are organised in India, industrial units depending on this raw material will find it difficult to have a smooth sail. This points to the bright future that is in store for natural rubber in India for the next two to three decades in terms of demand and possible opportunities for expanding the area under rubber.

COURSE OF ACTION

The traditional rubber growing regions of Kerala and Tamil Nadu



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offer only limited scope for new planting of rubber. What could be suggested in these regions is to produce more from existing plantations through adoption of appropriate technologies and to resort to phased replanting of uneconomic holdings. Alongside the steps initiated to take up rubber planting in North Eastern States and other non-traditional regions will have to be further intensified in order to widen the production base.

But non-traditional areas, especially the North Eastern States, pose a lot of problems which hinder the adoption of rubber cultivation. The most important hurdle is the political unrest and militancy prevailing in these regions which dissuades committed development agencies like the Rubber Board from launching promotional activities. One of the essential pre-requisites for ensuring development is peace and stability, which unfortunately is sadly lacking in Tripura and Assam where ambitious rubber planting programmes are planned. Another limiting factor is the long gestation period of rubber, with which the farming community of the non-traditional areas are not familiar at all. They are mostly used to short duration crops like paddy, vegetables, sorghum etc. The unsympathetic attitude of the financing institutions of the area blocking credit to the farmers to supplement the cash subsidy obtained from the Rubber Board is yet another negative factor. These constraints had posed problems for the promoters of the rubber among the rural farmers of the area. However, earlier plantations undertaken by innovators have started yielding and fetching good returns. Neighbouring farmers who were reluctant to take up this vocation are now motivated and persuded by the success of their colleagues. Thus, this crop is gradually gaining acceptance among the rural folks despite the hurdles listed.

Even with the best of efforts it will be many years when the non-traditional regions can emerge as a significant suppliers of natural rubber. Therefore for enhancing production and supply on a short term basis it would warrant strenthening the efforts in the traditional areas for maximising production.

WANTED : NEW PLAYERS

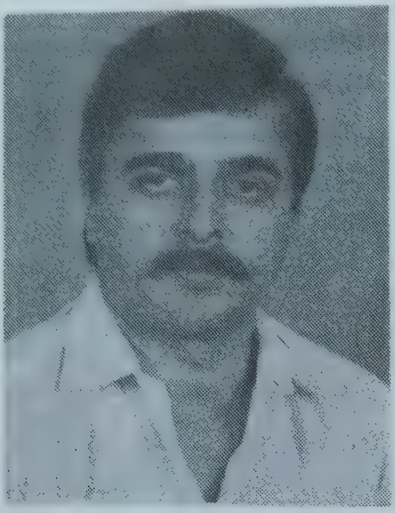
Almost 50 per cent of the natural rubber produced in this country is now consumed by the tyre sector. The idea recently mooted by the Automotive Tyre Manufacturers' Association (ATMA) in this connection that tyre companies should attempt to take up rubber planting assumes relevance and significance. It would be an excellent proposition if tyre makers can implement the same. This will have dual advantage — first one is that the tyre manufacturers will never starve for this material if each of them grow plantations adequate to meet the demand of individual units. Second advantage is that they will be able to produce the raw material at much cheaper rates which will help them enhance their competitiveness at home and abroad. Also they can sell tyres cheaper.

Adequate land can be spotted out for large scale planting in the non-traditional areas. Necessary finance for this can be availed from banks. A small subsidy towards reimbursement of the cost of the planting materials used for large plantations will be available from the Rubber Board — say Rs. 3,000/- per hectare. The Rubber Board has the technical and managerial capabilities to guide those who come forward to take up large rubber plantation. Mr. Indranil Biswas, Managing Director of Bengal Waterproof and Chairman of All India Rubber Industries' Association has already set the trend in this direction by acquiring land in Jalpaiguri area of West Bengal, where steps for planting rubber have been initiated. He is being supported by the Rubber Board in this new venture.

Planting of rubber in non-traditional areas has several advantages. They are :

- Gainful utilisation of cultivable fallows
- Generation of rural employment
- Restoration of ecological balance checks soils erosion
- Increases rubber production
- Income for the exchequer

Besides these advantages, rubber plantations yield honey, timber, firewood, oil and cake. Rubber is truly an environment — friendly tree crop, which is emerging as a new 'Kalpavriksha'. Therefore, it is high time that all out efforts are made to promote the cultivation of this tree crop as it ensures income, employment and adequate raw material for the rubber based industries. ✪



RUBBERWOOD :

THE WOOD OF THE FUTURE

O.T. JAYACHANDRAN

Vice-President - Rubber,
A.V. Thomas & Co. Limited, Kochi - 682 036.

Rubber has been planted over the past hundred years in a large number of tropical countries. The plantations are utilised for the production of rubber. Except for Malaysia & Thailand, most countries have largely ignored the potential of these plantations for wood production. Industrial utilisation of Rubberwood is rather recent. During the past few years. Rubberwood has been increasingly accepted internationally as a valuable timber species. Rubberwood is also used in the manufacture of plywood, particleboard, blockboard, wood cement board, medium density fibreboard and veneer.

Properly treated Rubberwood with all its qualities can be a substitute for many widely used natural tropical timbers.

90 per cent of the rubber is grown in Asia. India accounts for 5 per cent of this area. Indonesia, Malaysia and Thailand account for 74 per cent of the world rubber area. The area under rubber has more than doubled since 1950 and currently accounts for more than half the area of industrial timber plantations in developing countries

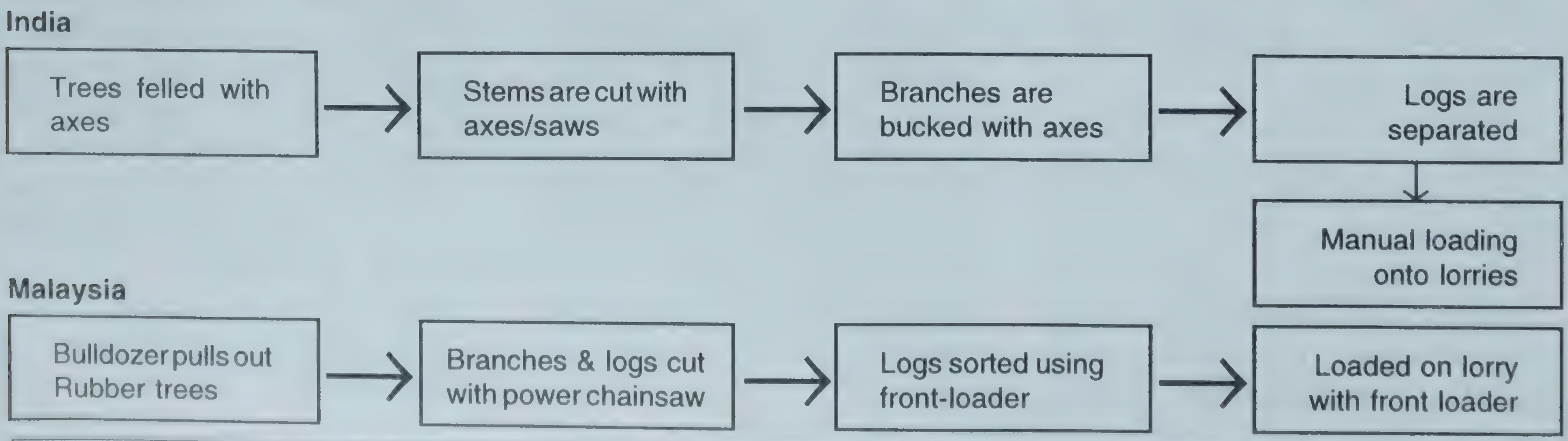
In India, currently the area under Rubber is about 500,000 ha. Normally, about 3 per cent of the area is felled annually for replanting. If about 3 per cent of the tapping area is felled annually, about 20,00,000 cft of good timber will be available.

Rubberwood has to be treated after felling as it is easily attacked by fungus and insects. The treatment has to be effectively done in a systematic manner. The result will be a durable wood, comparable to any other hardwood in all aspects.

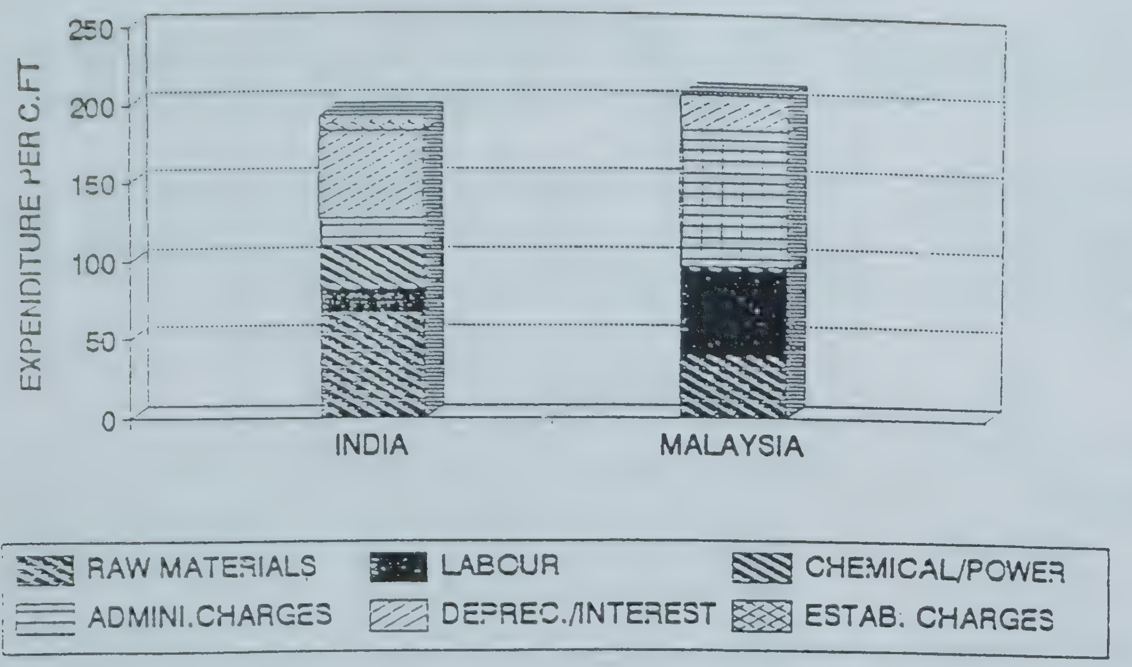
PROBLEMS

In India, the rubber tree is fully utilised, as firewood, cheap packing cases, veneers, plywood, etc. But for treatment, only about 7 per cent of the available timber is used. The cost of raw Rubber timber is the highest in the world. This is mainly because all parts of the tree is fully utilised and is in good demand. It is also a fact that rubber trees of good girth are becoming scarce. (Graph II).

The other reasons for the high price is because of the labour productivity and high cost on felling and loading. More than 50 per cent of the cost of timber is labour costs. About 10 workers fell, cut and load one lorry, which means that 40-50 workers are required for felling/handling of one hectare of rubber. This is rather ridiculous compared to 4 - 5 workers required in Malaysia. The main reason is out-dated and unscientific logging operations. A comparison on the logging is given below :


India
Trees felled with axes
Stems are cut with axes/saws
Branches are bucked with axes
Logs are separated
Manual loading onto lorries
Malaysia
Bulldozer pulls out Rubber trees
Branches & logs cut with power chainsaw
Logs sorted using front-loader
Loaded on lorry with front loader

GRAPH I
COMPARISON BETWEEN INDIA & MALAYSIA
— COST OF PRODUCTION —



Apart from the very low worker productivity, labour issues, inter-union rivalry and all such connected problems not only add to the cost, but also cause serious delays. Unless this unorganised sction of workers is brought under some controls, the situation will only worsen. Modernising the felling operation will also face severe resistance. Delays from felling to treatment can cause severe quality deterioration.

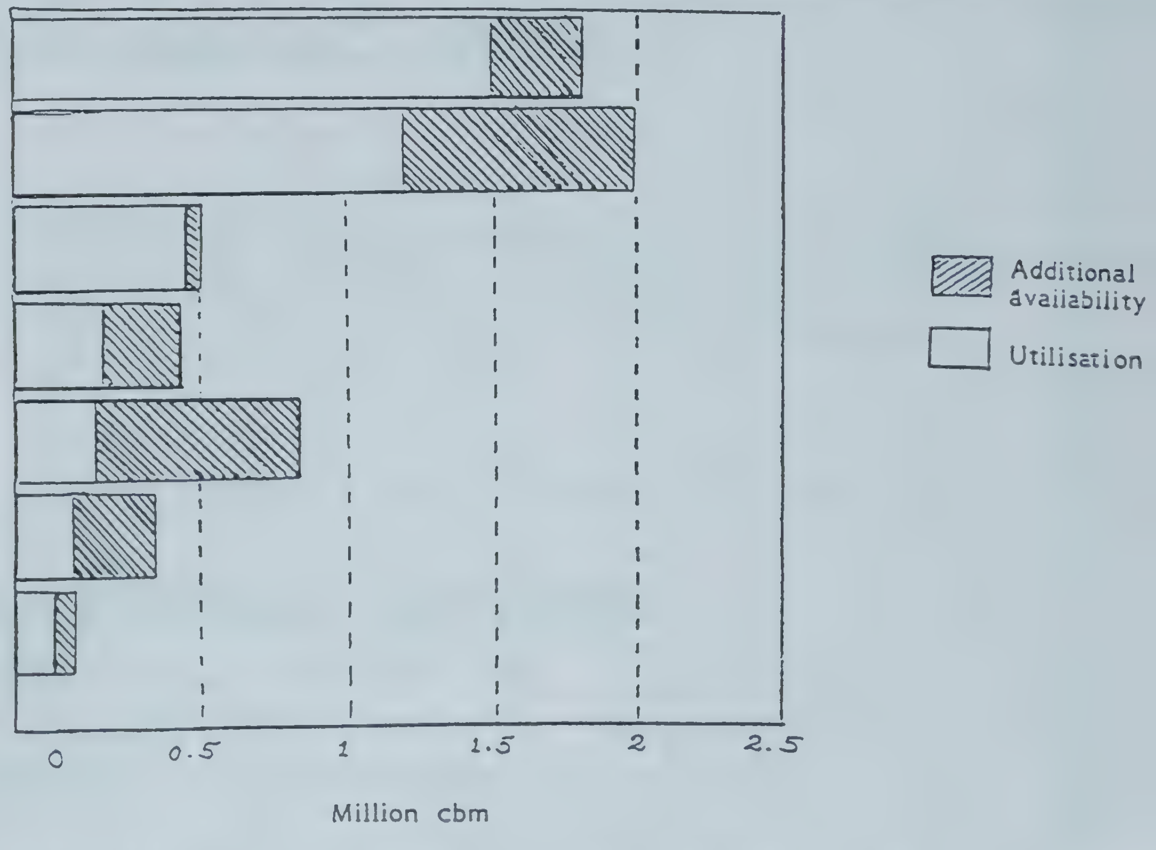
Graph I** shows the comparison of Indian raw material cost and Malaysian cost. It can be seen that the cost of raw rubberwood in India is 38 per cent of the total cost of production compared to Malaysia's 19 per cent. The utilisation of rubberwood, which is also another reason is shown in Graph II.**

Likewise, the chemical cost in India is much higher than in Malaysia (India 10 per cent, Malaysia 2 per cent). In fact, the price of chemical fluctuates so badly, that it affects cost drastically. The answer would be to import the chemicals on bulk orders. This can be done based on the export of Rubberwood. Further, there are no general standereds on the type of chemicals used, it's penetration and retention levels. Each processor does it in his own way.

In India, efficient and accurate machinery are not available for sawing, drying and finishing. Import of these machines is prohibitively expensive. As such, we are heavily dependent on the skill of the sawyers and wood working workers. The result is poor in recovery and outturn. With the market expanding for Rubberwood, we can no longer depends on existing systems and equipments, to effectively make use of the oppurtunity.

Drying of rubberwood is the most critical operation and it is highly prone to warping, splitting, etc. Most of the plants use the conventional air draft kilns, which

GRAPH II
UTILIZATION OF RUBBERWOOD LOGS & ADDITIONAL ECONOMIC AVAILABILITY IN THE SHORT TERM (1992-97) IN SELECTED ASIAN COUNTRIES



SOURCE : ITC

** 1992 figures.

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takes a longer duration in drying than vacuum driers. However, the viability of using the vacuum driers at its present cost is yet to be established. Mass production of finished and semi-finished goods need high capacity, efficient and accurate machines. These are also very expensive. India will have to develop high quality machines for these purposes of woodworking.

While internationally, Rubberwood has been well-accepted in many countries, in India, there is still a psycological barrier. This is because Rubberwood is considered a cheap and unless wood for furniture and building purposes. This negative product image is basically due to lack of product awareness. In many of our market studies, it was seen that the end user groups confused treated rubberwood with untreated rubberwood. Further, unscrupulous persons have put into the market poorly treated rubberwood to make a quick buck, adding fuel to the fire.

QUALITIES

Rubberwood is a high colour medium-density timber with reasonably good strength characteristics.

Wood Descripion -

Sapwood - not distinct

Colour - creamy white

Texture - coarse

Grain - straight or inter-locked

Mechanical & Technical Properties -

Density kg/cbm at 16% MC - 560 - 640

Tangential shrinkage co-eff% - 1.2

Radical shrinkage co-eff% - 0.8

Hardness N - 4350

Static bending N/sq mm at 12% MC - 66

The machining properties of treated rubberwood is comparable to all the other hardwoods. Rubberwood can be turned, easy to tenor drill, or bore. Good profiles and smooth edges can be obtained. The wood has also very good gluing and sanding properties. Most of the finishing materials available in the market can be used on Rubberwood with good results.

TREATMENT

Raw Rubberwood is easily attacked by fungus and wood borers. Preventive treatment is always necessary to eliminate this problem. A number of preservative formulations have been used in the rubberwood processing industry, among which are mixtures based on pentachloro phenolic (PCP) compounds, copper chrome arsenate (CCA) solutions and the borate/boric acid system. PCP is one of the best but due to its carcinogenic properties, this chemical is banned in most countries. The toxic properties of CCA have limited its use to applications where a minimum exposure of human beings to the CCA treated wood products can be ensured. Thus, the borate/boric acid system has become the most popular rubberwood preservative at present.

PROSPECTS

Timber, which means wood of commercial importance, is one of the most valuable and versatile raw material used by men and plays a vital role in the economic and industrial development of a nation. India requires a huge volume every year in the region of 37 million cbm. But the local supply is only about 30 million cbm and the rest has to be imported. The demand volume will increase to 42 million cbm by the turn of the country. The demand-supply gap will no doubt widen.

With other South-East Asian countries, banning the export of timber and logs, India will feel the pinch very soon. With dwindling forest areas, restrictions on cutting and urbanisation, the situation is bound to get to alarming levels. Part of the problem could be met with substitutes, like metal, plastic, etc. and to a large extent by Rubberwood — Replacing wood with wood.

There are hardly any internal applications where Rubberwood cannot be used. It can be used in a whole range of furniture types and styles for interior joinery and fitments, toys and giftware. It can be extensively used in chairs, stools, tables, beds, flooring, panelling, etc. Rubberwood's natural light colour is compatible with the modern taste for lighter or medium shades of furniture.

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There is no doubt there will be a dramatic growth in the use of Rubberwood not only in India, but also abroad. It is estimated that the consumption of Rubberwood and products will increase by 45 per cent to 50 per cent in the next five years. The requirement will be in the region of 350,000 cbm. Some of the reasons are :-

— Shortage of standard hardwood

— Growth in furniture consumption

— Import of furniture/furniture parts in most countries will rise

— Growth in builders woodwork, especially rubberwood flooring.

Rubberwood will become an important and favoured material in the future. This is also due to its product benefits, the stimuli of environmental pressure and improved styling and quality from the emergent Asian countries.

The products image must be improved in India. Awareness should be intensively followed up. Rubberwood producers must ensure top product quality and technical specifications. Rubberwood must also be positioned properly in the market and it has to be given a distinct image without undue comparison especially on price, with other hardwoods. It has to be remembered that Rubberwood is an agricultural product. As such, there will be variations from tree to tree or clone to clone. To control and also to bring about consistency in quality, great care will have to be taken at all stages of processing and also in the selection of trees. It is a steep climb to reach these levels of impeccable operations, but it is possible. If not, we cannot compete in the world market, where prices are definitely going to increase. This is apart from the inherent problems, mentioned earlier, which also we have to overcome.

The problem highlighted earlier in this article must be overcome to make Indian Rubberwood competitive in the world market. Rubberwood is no doubt, the wood of the future.

Reference :

Rubberwood — A Study on World Development Potential, International Trade Centre.

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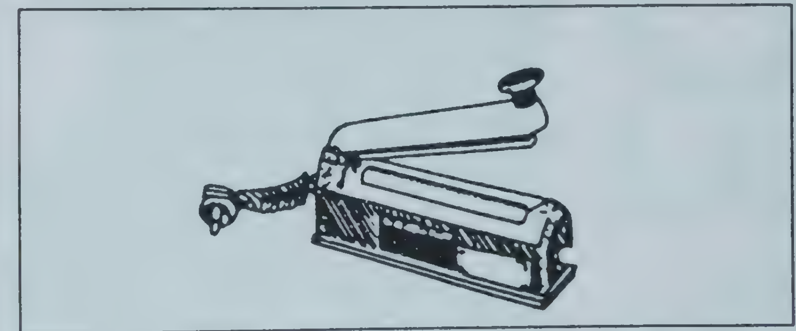

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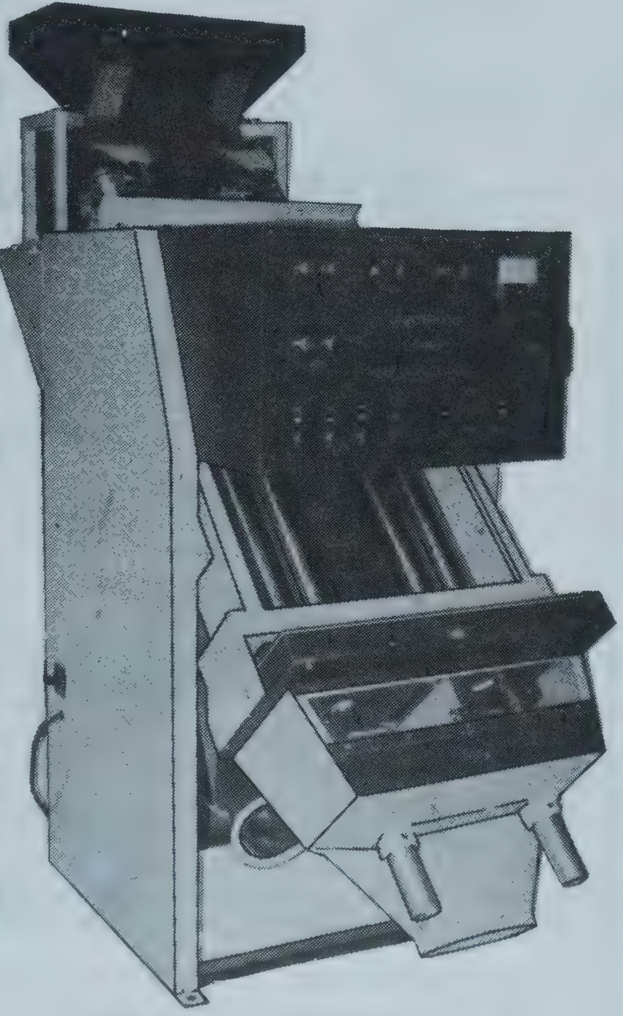

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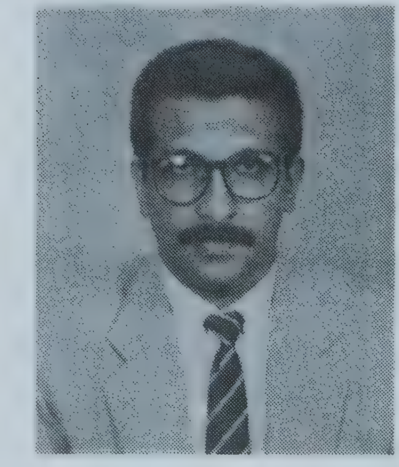

JACOB MANI MANNOTHRA
ADVISORY OFFICER,
UPASI R&D CENTRE, KOTTAYAM

The UPASI R & D Centre, established just three years ago in Kottayam, envisages its aim at resolving the various interconnected issues for increasing the profitability of rubber plantations in a socially equitable and ecologically sustainable way.

The attain this aim, a long-term perspective programme based on the needs of the rubber plantation industry and a unique implementation system was evolved. The Centre has liaised with the top established expertise in respective fields in India and abroad to solve the problems of the planting community quickly and cost-effectively while establishing a strong grassroot linkage. Today the services rendered by the R & D Centre inter alia includes need based innovative R & D in rubber, agro-management advisory services, organising topical workshops, trade promotion & publications. It is the small farmer friendly R & D service that has won wide acclaim.

Some of the areas of work and achievements are enumerated here.

CLONE INFORMATION :

Selection aid — The R & D Centre compiled a user-friendly information chart on the performance of various clones in India and Malaysia highlighting the susceptibility to diseases, brown bast, wind damage and other problems as well as yield of popular clones to aid selection of clones.

MAJOR ACTIVITIES

- **Promotion of UPASI's goodwill and image in the state of Kerala, nationally and internationally.**
- **Developing eco-friendly sustainable multi cropping systems in rubber.**
- **Promotion of Rubberwood in the internal and international markets, formation of Indian Rubberwood Task Force for its integrated development.**
- **Promotion of tapping systems to improve productivity.**
- **Developing organic nutrition methods.**
- **Providing discriminatory nutrient recommendations based on soil & foliar analysis.**
- **Conducting topical workshops.**
- **Publications.**

Location specific clone recommendation — The Centre is now in the process of initiating a database on actual 'site specific' performance of popular clones to evolve a location-specific clone recommendation system. It will also be useful in selecting a blend of clones to enhance the diversity and thus offset rapid spread of diseases/pests.

PLANT PROTECTION — NEW DEVELOPMENTS :

New formulation for ALF Control — The R & D Centre pioneered the conceptual development of oil-based Mancozeb and copper oxychloride combination in rubber against Phytophthora sp. for the first time in India. The formulation is being continuously improved based on the field trials, which is on the third year now. Based on the recommendation by the R & D Centre, the research department of Indofil Chemical Co. has developed a ready to use combination. This is expected to provide a broader spectrum of control of the fungus. This may also reduce the possibility of evolution and build up of resistant strains. Further the environmental load of fungicides is expected to be reduced, especially that of copper with obvious implications on the quality of Rubber. The trials are conducted in close collaboration with the Research Dept. of AVT Group and in liaison with the Rubber Research Institute of India.

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Pesticide load — In furtherance of its aim to cut down pesticide use in rubber, the Centre's research paved the way for reducing the pesticide load of Mancozeb as a panel protectant by more than 70 per cent. This is more economical and ecologically safer too.

New diseases —The Centre alerted the members on the susceptibility to patch canker in PB-260 and to stem bleeding disease in PB-235.

RAPID drc DETERMINATION :

The R & D Centre has evolved, arguably, the world's fastest drc determination technique based on Magnetic Resonance, in collaboration with the Nuclear Research Lab., New Delhi. The other special features of this new method, are the excellent repeatability, non-destructive nature and very low requirement of sample (2 ml.).

ORGANIC NUTRITION :

An organic nutrition system was developed by the Centre for a rubber based multicropping system consisting of vermicomposting, Nitrogen Fixing Cover crops (NFC) in the interrows, Nitrogen Fixing Trees (NFT) raised as border alley crops and waste recycling.

BIO-SOIL & MOISTURE CONSERVATION :

A unique bio-soil and moisture conservation system consisting of inward sloping contours coupled with silt pits, contour trenching and bio-bunding was developed for the rubber based multicropping system.

MULTI CROPPING SYSTEM :

The Centre developed a viable multicropping system consisting of fruit crops, spices, vegetables and medicinal herbs. It is a high intensity sustainable farming system which has increased the crop diversity, biomass production, recycling of bio-resources with substantial increase in profitability while conserving soil and the moisture. This unique system has caught the attention of growers and is being replicated spontaneously. The system mimicks the rain-forest associations and depends primarily on the organic nutrition and the bio-soil and moisture conservation developed exclusively for this. It also utilizes bio-pesticides and pesticidal plants to repel pests.

This system has proved to be profitable while being ecologically sustainable in commercial trials. It answers the various eco-problems of monocropping rubber and provides additional employment.

NUTRIENT RECOMMENDATION :

The R & D Centre has analysed more than four thousand soil and foliar samples for providing nutrient recommendations based on the needs of the growers. It is now developing a Computer Aided Recommendation system based on organic nutrition methods. It also assists growers in scientific sampling of soil and the leaf. It has also provided analytical services for fertilisers and manures for the members.

TAPPING TECHNIQUES :

It has been prompting tapping techniques which results in substantial yield increase of 50 per cent or more like Controlled Upward Tapping (CUT) and low frequency tapping which results in substantial yield increase of 50 per cent or more. The UPASI R & D Centre is also in the process of promoting novel tapping techniques based on ethylene gas and slow release of the ethylene coupled with latex diagnosis to sustain high yields, increased worker productivity while reducing the incidence of tapping panel dryness.

AWARENESS :

The R & D Centre has been organising 7 workshops from 1992 onwards to enhance the awareness of members, to emerging technologies and issues in organic farming, value addition, quality control and exports. The workshops are organised at local, regional, natinal and international levels based on the information needs. The response to these workshops have been excellent. This has now evolved as a rapid two-way, direct information dissemination system, vital in this age.

AWARD SCHEME

The UPASI R & D Centre has constituted award scheme consisting of Gold Medal, Certificates and a Memento in collaboration with Prof. Anil K. Gupta, Indian Institute of Management, Ahmedabad. The awards were for excellence in reportage on Sustainable Farming and for creativity and innovations in Sustainable Farming.

IMPORTANT ACHIEVEMENTS:

1. Emergence of CUT as a technique for increasing productivity in Rubber.

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2. Popularisation of alternative nutrition techniques like vermicomposting, biofertilisers and Nitrogen Fixing Trees and crops.
3. New possibilities in rubber based value addition and export.
4. New developments on rubber sprayer technology.
5. Promotion of innovations by farmers — composting cum biogas technique, soil & moisture conservation system and efficient and economic drier for rubber sheets.
6. Popularised rubberwood processing industry.
7. The workshops provide a new direct communication system for rapid awareness of state of the art in Research and Development and planter to planter linkage.

PROJECTS :

A project on rubber based farming systems employing Low Input Sustainable Agrotechniques was initiated with the assistance from CAPART during 1993.

The following activities were/are being carried out :

1. Hands-on training programme to small farmers.
2. Organisation of local workshops / meetings in the 5 locations.
3. Supply of planting materials and conducting classes on organic nutrition.
4. Farmer linkage programmes to give hand-on training on Rubber based sustainable farming systems.

A mass outreach programme was organised as a part of this programme. Apart from making presentations during seminars on 'organic farming', demonstrations for preparing vermi-compost and bio-pesticides such as Neem-Kernel decoction, Tobacco decoction, garlic chillies extract neem leaf concn. and bordeaux mixture are highlighted.

The UPASI farm at Punalur was selected as one of the best farms in terms of bio-diversity and sustainability by Dr. M.S. Swaminathan Research Foundation after inspecting the farm in depth.

World bank assisted project – The World Bank sanctioned Rs. 20 lakhs for establishing a discriminatory nutrient recommendation lab. at the UPASI R & D Centre at Kottayam.

Project on intercropping medicinal herbs in rubber plantations : To promote intercropping of medicinal herbs on rubber plantations, the R & D Centre set up a nursery of 17 species of medicinal plants and the planting material of several important species were raised for sale on a large scale supported by AVG Group.

TRADE PROMOTION :

(1) Rubberwood :

(a) Task Force : The R & D Centre co-ordinated the formation of the Indian Rubberwood Task Force for the integrated development of rubberwood.

(b) International promotion of Indian Rubberwood was initiated for the first time by the Centre with the assistance of International Trade Centre/ UNCTAD/GATT. Presentation on Indian Rubberwood were made in South-east Asia (Kuala Lumpur and Singapore). International exhibitions of Indian Rubberwood was set up in Orlando, USA in March 1994; at Rotterdam, Netherlands in November 1994 and at Copenhagen, Denmark in April 1995. These exhibitions and presentations have heralded the successful entry of Indian Rubberwood in these markets.

(c) Trade delegations from Nigeria, Cameroon & Ivory Coast from Africa to promote co-operation with Indian Rubber plantation companies was co-ordinated under the auspices of ITC/UNCTAD/ GATT. A trade delegation of furniture manufacturers from Singapore was co-ordinated through the KSIDC and Singapore Trade Development Authority to promote joint activities in Rubberwood Industry in India.

(2) Rubber chemistry :

A rapid drc estimation technique which is non-destructive was developed with the collaboration of Nuclear Research Lab., New Delhi, which was published by the most prestigious Journal of Natural Rubber Research of RRIM, Vol. 8 (3) 3rd quarter 1993.

✪

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TEA BLISTER BLIGHT CONTROL

Suggestions on the usage of Hexaconazole

Critical field experiments, for the last four years, have indicated the usefulness of hexaconazole in controlling the tea blister blight disease. This fungicide in combination with copper oxychloride was found to be superior to the presently used copper-nickel combination. The number of spray applications with hexaconazole + copper could also be reduced considerably. A detailed article containing the results of the experiments would be published in due course.

The residues of hexaconazole are being worked out and the Maximum Residue Levels (MRL) of the compound would be fixed shortly. However, the fungicide has been found to be safe under the dosages evaluated.

Those who are interested in trying this compound on a small scale, may employ the following spray schedule. The quantities of fungicides stated are to be used per hectare.

FROM JUNE TO MID AUGUST

Hexaconazole 200 ml + copper oxychloride 210 g at 7-day spray intervals.

FROM THE THIRD WEEK OF AUGUST TO MID OCTOBER

Hexaconazole 100 ml + copper oxychloride 210 g at 7-day spray intervals.

FROM THE THIRD WEEK OF OCTOBER TO END NOVEMBER

Hexaconazole 200 ml at 14-day spray intervals.

From June to mid September, it will be beneficial to incorporate Triton AE (0.05 per cent) to the fungicide fluid, in view of the heavy rainfall.

The schedule suggested may be carried out in tea under plucking only.

The overall cost of treatment with hexaconazole is almost comparable to the present copper + nickel usage and is envisaged as an alternative to nickel chloride.

Hexaconazole is being made available as Contaf by Rallis India Limited, as a 5 per cent EC formulation.

B. CHANDRA MOULI
UPASI Tea Research Institute

CERTIFICATION OF BICLONAL SEED BARIS

The following five biclonal seed stocks released by UPASI TRI during December, 1993 have now been approved by the Tea Board.

Seed stock	Parent clone (Female parent		Male parent)
UPASI : BSS-1	UPASI-10	x	TRI-2025
UPASI : BSS-2	UPASI-2	x	TRI-2025
UPASI : BSS-3	UPASI-9	x	TRI-2025
UPASI : BSS-4	UPASI-15	x	TRI-2025
UPASI : BSS-5	CR-6017	x	UPASI-8

Seed baris of some of these stocks have already been planted in different districts. It is essential to have the seed baris certified by the UPASI TRI to ensure production and supply of authentic and approved seed material. In this context, the estates are advised to get in touch with the Director, UPASI Tea Research Institute, Valparai - 642 127, giving the following information.

1. Name of the Estate
2. Seed stock number
3. Area in hectare(s)
4. Date of planting
5. Design and spacing with the field map
6. Total number of female parent plants.

The Director or his authorised representative would visit the block(s) for inspection before certification.

The list of approved seed producers will be published in appropriate publications of the UPASI TRI, from time to time. The biclonal seed should be procured only from the approved producers.

Guidelines in respect of seed production/certification were published in 1993, in the *UPASI Scientific Department Bulletin* No. 46 (pages 153 to 154).

ANALYSIS OF SOILS, PLANTS AND AGRO-CHEMICALS

Revised Fees Effective from June 1, 1995

		Member estates of UPASI Revised rate (Rs.)		UPASI Firm members Revised rate (Rs.)	
A.	**SOILS**				
1.	pH, EC	20/-	sample	40/-	sample
2.	Organic matter	40/-	sample	80/-	sample
3.	Available and exchangeable nutrients	50/-	sample/ nutrient	100/-	sample/ nutrient
4.	Total nutrients	100/-	sample/ nutrient	200/-	sample/ nutrient
5.	Routine analysis of pH, EC, OM, P, K, Ca & Mg	100/-	sample	200/-	sample
6.	Mechanical analysis of soils	150/-	sample	300/-	sample
7.	Micronutrients (Zn, Mn, Fe, Cu) and Nitrite	50/-	sample/ nutrient	100/-	sample/ nutrient
8.	Water holding capacity of soil	50/-	sample	100/-	sample
9.	Cation exchange capacity (CBE)	125/-	sample	250/-	sample
10.	Degree of potassium saturation (DKS)	125/-	sample	250/-	sample
11.	Phosphorus and potassium fixing capacity for soils	125/-	sample/ nutrient	250/-	sample/ nutrient
B.	**FERTILIZERS**				
1.	Identification qualitative tests	35/-	nutrient/ sample	70/-	nutrient/ sample
2.	Quantitative N and K analysis	100/-	sample	200/-	sample
3.	Quantitative N, P and K analysis	150/-	sample	300/-	sample
4.	N, P, K and Mg analysis	175/-	sample	350/-	sample
5.	Sodium only	50/-	sample	100/-	sample
6.	pH of chemicals	20/-	sample	40/-	sample
7.	Biuret in urea	100/-	sample	200/-	sample
8.	Organic manures (pH, EC, C, N P and K)	185/-	sample	370/-	sample
9.	Purity tests of Zinc sulphate (comprehensive on all aspects with special reference to tea)	225/-	sample	450/-	sample
10.	Magnesium sulphate, Manganese sulphate and Boric acid	100/-	sample	200/-	sample
11.	Secondary and micro nutrients, microfood fertilisers (Zn, Mn, B, Na, Fe & Mg)	300/-	sample	600/-	sample
C.	**SOIL AMENDMENTS**				
1.	Liming materials	75/-	sample	150/-	sample
2.	Aluminium sulphate	75/-	sample	150/-	sample

			Member estates of UPASI Revised rate (Rs.)	UPASI Firm members Revised rate (Rs.)
D.	**FUNGICIDES**			
	1.	Copper oxychloride formulations	100/- sample	200/- sample
	2.	Nickel chloride & formulations	150/- sample	300/- sample
	3.	Copper sulphate	75/- sample	150/- sample
	4.	Copper alone	50/- sample	100/- sample
	5.	Metham sodium	110/- sample	220/- sample
	6.	Calixin, Bavistin and other fungicides	175/- sample	350/- sample
E.	**PESTICIDES**			
	1.	Detailed analysis - Assaying (chemical) inclusive of pH and surface tension for use in tea	200/- sample	400/- sample
F.	**WEEDICIDES**			
	1.	Detailed analysis - Assaying (chemical) inclusive of pH and surface tension for use in tea	250/- sample	500/- sample
G.	**MISCELLANEOUS**			
	1.	Purity tests, not comprehensive on all aspects but with special reference to tea	150/- sample	300/- sample
	2.	Ash content	35/- sample	70/- sample
	3.	Wetting agents (EC and surface tension only)	75/- sample	150/- sample
	4.	Moisture content	35/- sample	70/- sample
	5.	Neem oil in neem cake	150/- sample	300/- sample
	6.	Nitrogen content only	75/- sample	150/- sample
	7.	N, P and K analysis in leaf sample	125/- sample	250/- sample
	8.	N, P, K, Ca and Mg analysis in plant samples	200/- sample	400/- sample
H.	**TESTING OF EQUIPMENTS**			
	1.	Thermohygrograph	150/- equipment	300/- equipment
	2.	pH meter	150/- equipment	300/- equipment

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The
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Tea is said to be one of the leading export oriented commodities in India. Therefore, the need for nourishing and safeguarding the industry in every respect is most urgently felt and with this idea in mind, the instant work aims at dealing exclusively with the latest position of the law on tea plantation, manufacturing including blending and packaging, marketing, distribution as also export.

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Varied issues

Leaving apart the Act in question, it incorporates Tea Rules 1954, Tea Board By-Laws 1955, Tea (Distribution and Export) Control Order 1957, laws affecting Tea Packaging under Trade and Merchandise Marks Act 1958, Standards of Weights & Measures (Packaged Commodity) Rules 1977, Tea (Marketing) Control Order 1984, Tea (Warehouse Licensing) Order 1989 and lots of other important rules and orders.

Truly indispensable

The work appears to be an excellent source of guidance especially to lawyers, brokers, bankers, municipalities, academics as well as tea estate and plantation management in this potentially complex area of the law and offers an authoritative coverage of legal aid, advice and assistance.

Edition 1995

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elh

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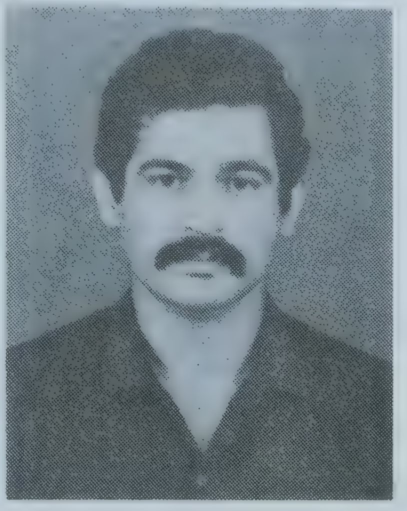

The weather pattern in the last calendar year has been quite peculiar. Though the monsoons were timely due to extremely low temperature in June, the yield of the district fell by 35 per cent compared to the previous year. On the other hand, July recorded one of the highest yields due to intermittant showers and not the usual continuous downpours. However, due to the erratic weather pattern and the resultant high humidity, Helopeltis ravaged quite a few estates in Peermade and Vandiperiyar. Though the overall crop for the financial year in the district dropped by only 2.6 per cent, the drop in crop of the last quarter namely, January to March, 1995 has been 26 per cent.

We were happy to note that the tea prices showed an upswing from the second half of the last financial year till March, 1995. Unfortunately, it is disconcerting to note that recently the prices have started sliding down. If this trend continues, we shall once again be selling teas at unremunerative prices and it just might break the backbone of our industry.

In this gloomy environment it is depressing to note that the Trade Unions are hardening their stand in their demand for an unreasonable increase in the workers' wages. While I fully concur that the wages need revision, the trade unions should be made to understand that increase in wages should be linked to productivity. It is a well known fact that the economic strength of a nation ultimately depends on the productivity of its industrial sector. A study of Indian Industry in the "economic and political weekly" has recently drawn an alarming conclusion on the labour productivity in India when compared to some other developing as well as developed countries. It has shown that the labour productivity in India is the lowest, almost 1/8th of Japan and the labour absenteeism the highest at more than double the rate in Japan. Under the liberalisation programmes and the new economic policy of the government, Indian industries have to prove their viabilities in the international markets. In an highly labour intensive industry like tea unless labour productivity is improved our prices cannot compete in the open market.

As the scenario of the tea industry continues to be bleak, your committee had to take the unfortunate decision of not only deferring the construction of a central office for the Association, but was also constrained to request United Planters Association of Southern India to defer the holding of the 7th Joint Area Scientific Symposium in our district in 1995.

It has been reported in the press that the Centre proposed to revise the limits of payments as per the Payments of Bonus Act, 1965. The Government should also realise that when managements have insisted in conforming to the provisions of the Bonus Act, the militant trade unions have violated all norms and held the management to ransom. This has been reflected in the prolonged labour agitations experienced by two of our major groups of estates and one member estate in the winter of 1994. This culminated in a lockout in one of the groups and the member estate. The Act should also be amended to ensure that an enforcement

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agency is formed to see that the Act is implemented and all parties abide by it.

After being in the doldrums for many years, the Coffee prices have become very promising. We hope this profitable trend is maintained so that development and extension works can be undertaken.

The cardamom prices have also maintained a satisfactory trend and hope that this situation prevails for a stretch of time.

While the telecommunication facilities in our district have shown a definite improvement it is regrettable that the roads remain in a deplorable condition. Even though this district being a major foreign exchange earner as well as an important tourist attraction, the government has paid scant attention to the repair and maintenance of roads.

— Excerpts from the Chairman's address at the 121st Annual General Meeting of the Central Travancore Planters' Association held on 20th May, 1995.

OBITUARY

Mr. IRFOR THOMAS

Mr. Irfon Thomas former Senior Manager in the erstwhile Co-operative Wholesale Society - now Parry Agro Industries Limited - died at his home near Wigan, U.K. last September.

"Taffy" Thomas as he was known to his many and wide-ranging contacts, began his career in 1943 at the CWS and spent 20 years managing its tea plantations in South India, a role which culminated in three years as General Manager of the Co-operative Tea Society Limited in Sri Lanka. He was 67 and leaves behind his wife and three children.

Mr. R. STOREY DICKSON

Mr. R. Storey Dickson passed away at Pretoria, South Africa, on 1st March, 1995.

Joining the Kanan Devan Hills Produce Company Limited on 22.2.1947, Mr. Dickson retired on 31.7.1969 as Manager, Instant Tea Division of the Successor Company, Tata-Finlay Limited. Earlier, he had served the Kanan Devan Hills Produce Company and its associated Sterling Companies as Manager - Industrial Relations for several years.

Mr. Dickson had served the plantation industry in several capacities on the UPASI, APK, PAT and KDPA Executive Committees. He was the Chairman of APK in 1960/61 and the President of UPASI in 1964/65.

PERSONALIA

RUBBER BOARD NEW CHAIRMAN

Mr. K.J. Mathew (45) erstwhile Secretary, Department of Co-operatives, Government of Kerala, took over as Chairman of the Rubber Board on 7th June 1995.

Mr. Mathew who hails from Chennadu in Meenachil Taluk of Kottayam District, is a Post-Graduate in English literature and started his career as a Lecturer in Kerala Varma College, Thrissur. Later, he was selected to the IAS, IFS in 1974. He has held several prestigious positions under Government of Kerala as Managing Director of Kerala Civil Supplies Corporation, Director of Public Instructions, Joint Secretary of the Planning Board and District Collector, Information & Broadcasting Ministry. He has also acquired Diploma in Development studies from the Cambridge University.

CPA CHAIRMAN

Mr. A. Viswanath, Senior Manager, Nallur Estate, Suntikoppa - 571 237, has been unanimously elected Chairman of the Codagu Planters' Association for the year 1995-96. Mr. N. Mahabaleshwara Bhat has been elected Vice-Chairman.

CTPA OFFICE-BEARERS

Mr. Cherian Kovoor of Tyford Estate, Fairfield - 685 504, has been unanimously elected Chairman of the Central Travancore Planters' Association for the year 1995-96. Mr. S. Soundararajan has been elected Honorary Secretary.

The other members of the Committee are :
Messrs. S. Azariah, J.N. Rajah, S.K. Mishra, M.N. Chengappa, C.G. Poulose, M.A. Sampath, Sugumar Thomas, Eapen P. Joseph, A.E. Joseph and Joy Joseph.

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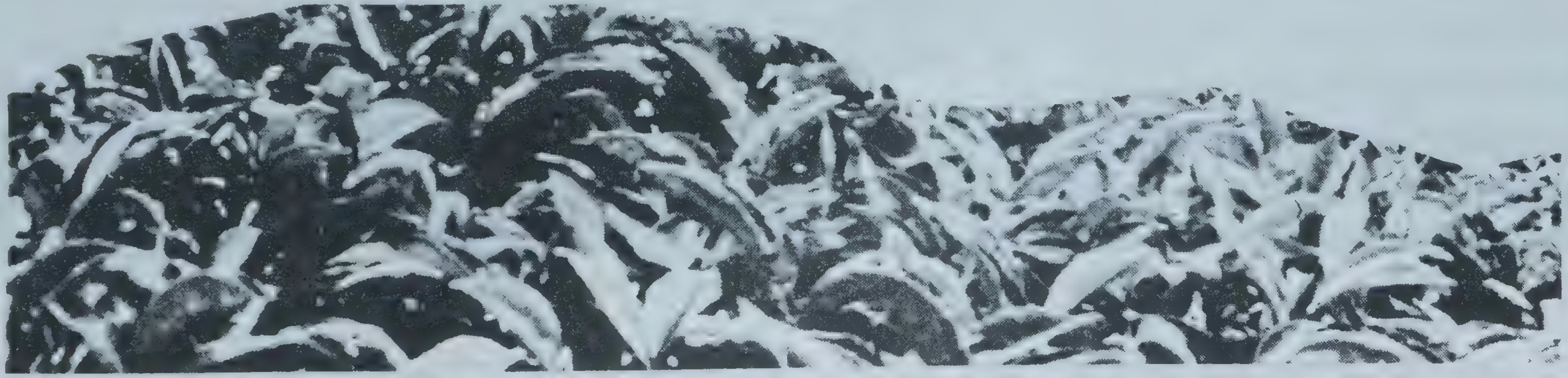

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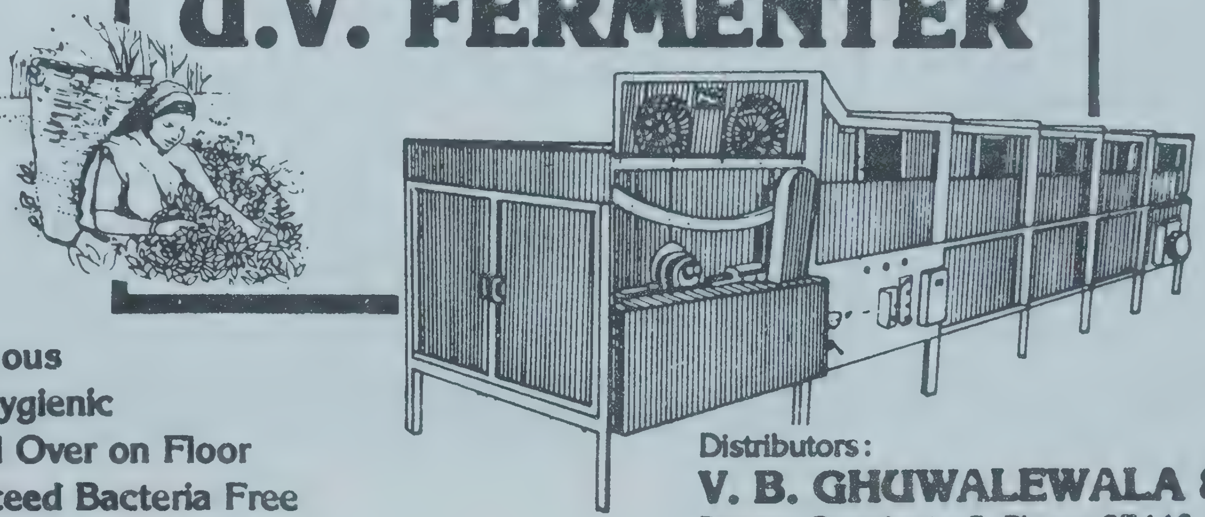

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MEETINGS

- Tea Committee Meeting : Coimbatore : 8th May1995.
- Rubber Committee Meeting : Coonoor : 24th May 1995.
- Trustees Meeting : Coonoor : 24th May 1995.
- Executive Committee Meeting : Coonoor : 24th May 1995.

TEA BOARD DEVELOPMENT SCHEMES

a) Tea Plantation Finance Scheme

The Board has increased the rate of interest under the schemes as under :

Prior to 1st April 1995	After 1st April 1995
Gross interest 15.00% p.a.	Gross interest 16.5% p.a.
Rebate for timely payment 3.00% p.a.	Rebate for timely payment 3.00% p.a.
Effective rate 12.00% p.a.	Effective rate 13.5% p.a.

b) Tea Machinery & Irrigation Equipment Hire Purchase Scheme

	Existing rates	Revised rates	Rebate for prompt payment	Effective Rates
A. All tea gardens except co-operative Societies	15½%	17%	3%	14%
B. Co-operative Societies	14½%	16%	3%	13%

As reported, the Tea Machinery Hire Purchase Scheme has been converted into a loan scheme. Details have been separately circulated to tea members.

FAO MEETING

Mr. M.M. Venkatachalam, member of UPASI Executive Committee and Mr. P.K. Pani of Harrisons Malayalam attended, on behalf of UPASI, the Eleventh Session of the Intergovernmental Group on Tea held in Rome during 10-13 April 1995. It was participated by 76 delegates from Argentina, Bangladesh, Burundi, Canada, China, the European Community, Germany, India, Indonesia, Iran, Ireland, Italy, Japan, Kenya, Mauritius, Morocco, Netherlands, Pakistan, Rwanda, Saudi Arabia, Spain, Sri Lanka, Tanzania, Thailand, Turkey, Uganda, U.K. and U.S.A. Observers from the International Trade Centre UNCTAD/GATT and International Tea Committee were also present.

While reviewing the market situation, the meeting noted that tea prices in real terms had declined since demand increase has not been keeping pace with supply increase. The suggested action plan to improve prices included generic promotion, quality enhancement, product diversification, development of new markets and expansion of new types of consumption. While discussing the ways and means to overcome the adverse effect of the emerging surplus situation, the meeting recommended considering the possibility of eliminating the excess of supply starting from the low quality tea not conforming to ISO 3720 standard. It was suggested that FAO should prepare an econometric model to evaluate the impact on prices, of changes in production and consumption. Discussions were also held on the project on tea consumption and human health. The issue of pesticide residue also came up at the meeting.

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TEA PRODUCER'S FORUM

A meeting to consider the formation of a Forum of Tea Producing Countries was held in Colombo on 27 - 28 April 1995. India, Sri Lanka, Malawi, Iran, Bangladesh, Indonesia and China participated at the meeting. Mr. K. Ahmedullah, member of UPASI Executive Committee attended the meeting. The producing countries expressed concern at the meeting on the decline in tea prices in real terms. The need to maintain quality was stressed and the proposal for adoption of ISO 3720 standard for tea was supported. Undertaking generic promotion of tea both in the producing and exporting countries was another proposal that was mooted. The constitution, funding and other details are being worked out.

INTERNATIONAL COFFEE ORGANISATION

The ICO had convened a meeting on 17th May 1995 at London of representatives of private sector Coffee Associations. It was attended by Mr. C. P. Kariappa, Member of UPASI Executive Committee. The proposal to establish a Trade Advisory Committee for the ICO was endorsed at the meeting. Membership of the Committee will be open to growers, exporters and roasters. The Committee will render advice to the Executive Board of ICO and the Secretariat on the needs of the private sector. The Forum will also interact with each other on the needs of the different types of the coffees required by the roasters. It was decided that information gathered by the ICO on quality and health aspects will be disseminated to the Associations. The participants stressed that the "Gourmet Coffee Project" be pushed forward under the Common Fund for Commodities. The need for ICO providing periodical data on coffee was also taken up at the meeting.

THE PLANTATIONS LABOUR (AMENDMENT) BILL

As a sequel to the meeting with the Union Labour Minister in April, the Ministry of Labour, Government of India, has now communicated to the UPASI that the Plantations Labour (Amendment) Bill, 1992, pending before the Lok Sabha will be withdrawn and in its place, a Bill with certain modifications will be introduced so as to accommodate the consensus arrived at the meeting of the Tripartite Industrial Committee on Plantations held in April 1994. The major change contemplated relates to medical facilities, by which, in place of requiring every plantation to have its own Garden and Group Hospitals within a stipulated timeframe, under the proposed Bill, the setting up of such hospitals will be based on the strength of employment on a plantation, as recommended by a Sub-Committee of the I.C.P. constituted specifically for the purpose. Some of the other provisions in the proposed Bill are :

- Retention of the safety provisions as under the 1992 Bill, but in place of the employer appointing a qualified person to supervise the handling of chemicals, insecticides, etc., the employer can designate a person from amongst the employees for this purpose.
- Prohibition of employment of young children who have not completed fourteenth year.
- Exclusion of voluntary organisations from filing complaints regarding commission of offences under the Act.

UPASI, in consultation with the State P.As., has examined the modified proposals and sent a detail representation to the Ministry, suggesting, wherever necessary, revised drafts in the interests of the industry.

THE MATERNITY BENEFIT (AMENDMENT) BILL, 1995

The above Bill, to amend the Maternity Benefit Act, 1961, has been introduced in the Parliament. The Bill seeks to place M.T.P. on an equal footing with 'miscarriage' and to provide for six weeks' leave with wages, at the rate if maternity benefit, for M.T.P. Another proposal is to grant two weeks' leave with wages to women undergoing tubectomy operation. The existing provision of one month's leave with wages for women suffering from illness arising out of pregnancy, miscarriage, etc., is proposed to be extended to M.T.P. and tubectomy also. The pros and cons of the various provisions are being examined to send out a representation to Government, including a suggestion to restrict the maternity benefit to two child births as a *quid pro quo* to the proposed amendments.

SEMINAR ON LABOUR MANAGEMENT

A seminar on Labour Management was organised by UPASI-KVK on 8th May. Dr. B.R. Patil, Professor of Personnel and Human Resources Management, Indian Institute of Management, Bangalore participated. The issues covered included changes in the management system, need to amend labour legislations to keep pace with the socio-economic changes in the country, security of tenure, training and re-training, minimum basic requirements and wage levels, collective bargaining, redefining work ethos and productivity improvements. Managing Directors and Executives of Plantation Industries attended the seminar.

SEMINAR ON CUT FLOWER PRODUCTION & MARKETING : AN INSIGHT

A two-day seminar on "Opportunities for cut flower production and marketing : An insight" was organised on 30th and 31st May, 1995. Around 200 delegates participated in the programme including Farmers, Bankers, Government Officials and Cut Flower Exporters. The Programme was inaugurated by Mr. Vivek Harinarain, Chief Regional Executive, Tea Board. The Chief Guest of the programme was Mrs. Sabitha Bengra, Additional Collector (Development) and Project Director of HADP, Nilgiris. Formation of a *Farmers Consortium* is one of the major outcomes of the seminar.

PERSONALIA

Mr. R. Chandrashekar has taken over as Joint Secretary (Plantations), Commerce Ministry.

Mr. S.S. Ahuja has taken over as the Chairman of the Tea Board.

Mr. K.J. Mathew is the new Chairman of the Rubber Board.

Mr. Ramkumar Menon, member of UPASI Spices Committee, has been elected as the Vice Chairman of the Spices Board.

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COCHIN	37.77	38.27	35.52	36.20	29.84	30.69
COIMBATORE	38.17	36.87	31.95	35.74	25.84	29.42
COONOOR	36.90	32.30	29.54	35.18	22.85	22.29
AVERAGE	37.44	36.65	32.67	35.96	26.47	28.13
COFFEE						
a) Private Auction						
PLANT - A	105.00		101.97		88.74	
ARA. CHY. AB	93.50		84.00		80.06	
ROB. CHY. AB	87.50		81.57		64.95	
b) Coffee Board Auction						
PLANT - A	115.56		124.47		76.55	
ARA. CHY. AB	102.45		109.21		73.27	
ROB. CHY. AB	96.31		102.69		62.21	
RUBBER						
a) Kottayam						
RSS LOT	62.75		35.50		26.95	
RSS IV	64.50		37.25		28.75	
b) Kuala Lumpur						
RSS I	59.02		43.39		30.49	
SPICES						
CARDAMOM	238.32		272.37		282.10	
PEPPER	86.75		74.00		47.25	
CLOVES	93.00		90.00		74.00	
NUTMEG	103.00		95.00		74.00	

TEA CROP - SOUTH INDIA

APRIL		TONNES
1995	:	14,537
1994	:	16,408
1993	:	16,111
JANUARY TO APRIL		
1995	:	48,881
1994	:	59,913
1993	:	49,602

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29.8.96

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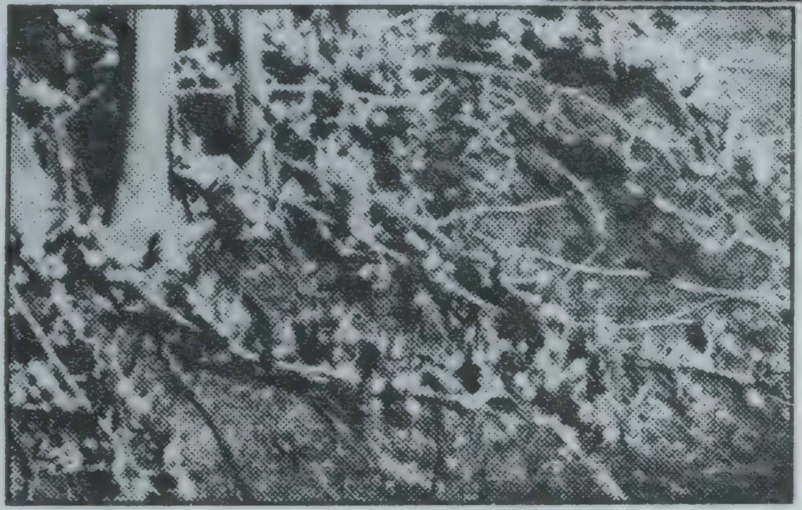

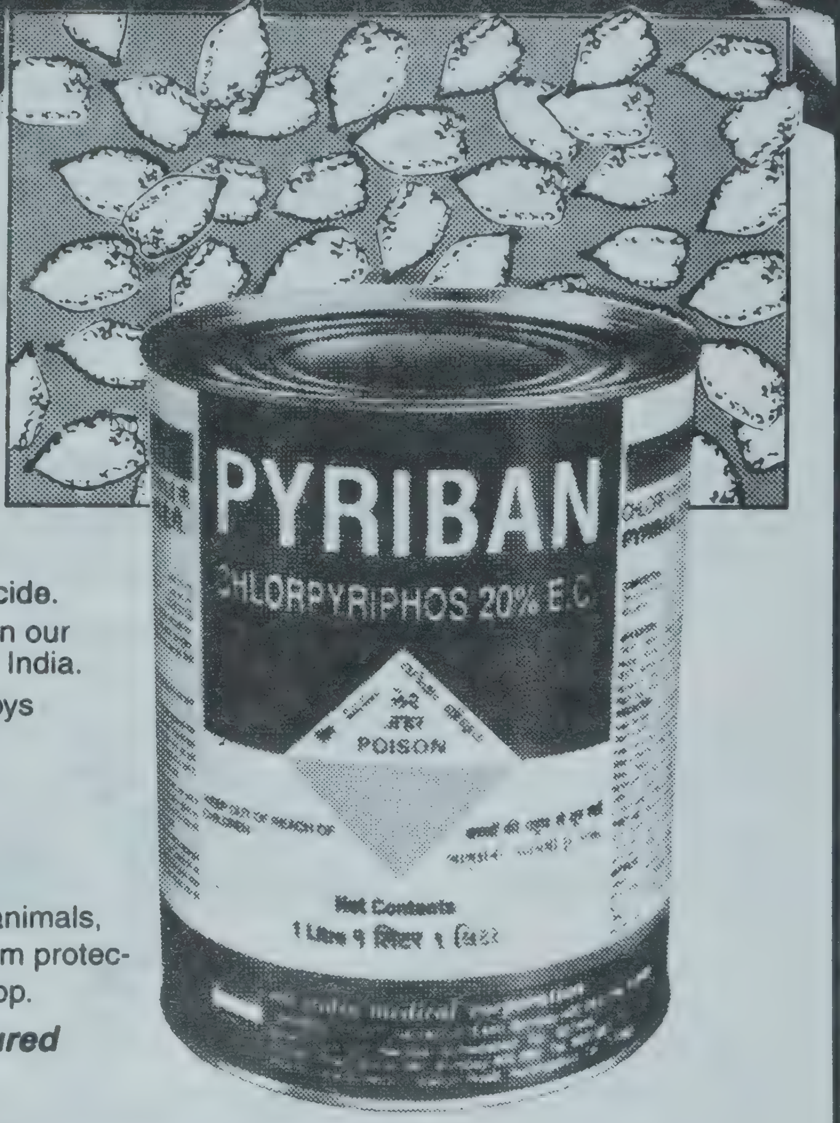

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BEWITCHING BEVERAGES

To drink what? That is the million dollor question. Consumer is confused and confounded with the array of drinks, each beckoning him.

Drink to cheer (Tea), invigorating drink (Coffee), manly drink (IMFL), WOG drink (Cola) or traditional drink (Milk).

Excepting the last one, which is advocated by all parents above 50 and completely ignored by the children, all the other beverages reach us through ads. And ads, becoming sexy as the days go by, which ensures more attention. And recall, as the ad. Pundits say.

"Generic promotion is a must for tea", tea planters assert. "We must take coffee to its original pedestal and prestige", coffee planters demand. Since we Indians like to discuss any matter under the Sun and even above the Sun *ad nauseam,* we are still discussing the merits and demerits of the campaign, the *modus operandi* to be adopted, who should bell the cat (money), what is the time frame, who is the target audience, etc. etc.

Being at this game for ages, those who brought colas and IMFL to this country did not wait. They just started the promotional campaign with a bang. Catchy ads, in print media and T.V. — Spending mega bucks. Gladdening the hearts of ad. agencies.

And we continue to debate on promotion of tea as a health drink or coffee as a drink of connoisseur. And now another added dimension. Should promotion be for "Pure Coffee" or just "Coffee" which means coffee mixed with chicory. Tomorrow somebody will say "Campaign for Orthodox Tea and not just Tea". So another debating point. Time passes.

We are good at criticizing. So, many condemn the promotional campaigns as wasteful expenditure. But those who are in the game say "Lure the Customer" (by hook or crook). Operate in the grey area how far the ads. can reveal without being hauled for going beyond censorship rules. Assert the best points but be innocuous.

Puritans said "No advertisements on liquor". Government nodded. But, for the liquor companies, obstacles were not new. Past masters in circumventing, they started ads. for glassware, of course, in the name of liquors they were selling. Again, operating in the grey area. The Charade. Everybody knows what the ads are about. But the Government is happy that no rule is violated. Puritans are happy that liquor is not advertised. Hypocrisy? But then, if hypocrisy can make a lot of people happy, why not?

So where are we? Back to square one? Yes. No, because family planning or not, the numbers are increasing. They have to drink something. Milk is *passe*. Colas and hard liquors are costlier, besides the fact that hard liquors cannot substitute soft drink in the day time at least. So, they will have to drink tea or coffee.

That is our hope. And as Indians, we always live on hope.

✪

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Opinions expressed in this journal are not necessarily those of the UPASI.

COVER FEATURE

FERTILITY STATUS OF THE SOIL

By

M.SURENDRA MOHAN*

INTRODUCTION

The word soil is derived from the Latin word 'Solum' meaning the floor.

Soil is a complex and dynamic system containing mineral matter, living beings, organic matter, water and air, each of which is interrelated physically, chemically and biologically (S. Natesan, 1989).

Thus, Soil is a three phase system viz. Solid, liquid and gaseous with living organisms in it.

PHYSICAL PROPERTIES

The physical properties of a soil is governed by a number of factors. Some of the important factors which are listed below are considered here for discussion.

Texture
Structure
Particle density
Bulk density
Porosity
Water holding capacity
Soil colour

TEXTURE : Soil texture refers to the relative percentage of sand, silt and clay in a soil. The size of mineral fragments are the basis for classification as sand, silt and clay (Table - 1).

Table - 1 : Classification of soil separates (International system)

Soil separate	Diameter range (mm)
Clay	Below 0.002
Silt	0.002 to 0.02
Fine sand	0.02 to 0.20
Coarse sand	0.20 to 2.00

The percentage of sand, silt and clay determines the textural class of the soil. The more common textural classes with the percentage of sand, silt and clay are given below (Table - 2)

Table - 2 : Textural classification of soil

Textural name (soil class)	Range in percentage		
	Sand	Silt	Clay
Sand	85-100	0-15	0-10
Loamy sand	70-90	0-30	0-15
Sandy loam	43-80	0-50	0-20
Loam	23-52	28-50	7-27
Silt loam	0-50	50-88	0-27
Silt	0-20	8-10	0-12
Sandy clay loam	45-80	0-28	20-35
Clay loam	20-45	15-53	27-40
Silty clay loam	0-20	40-73	27-40
Sandy clay	45-65	0-20	35-45
Silty clay	0-20	40-60	40-60
clay	0-45	0-40	40-100

The sandy group includes all soils in which silt plus clay together makes up less than 20 per cent of the total. A soil to be classified as clay must contain atleast 30 per cent of clay particles. A loam may be defined as a mixture of sand, silt and clay particles as to exhibit sandy and clayey properties in about equal proportions. Most of the fertile soils are loamy

Structure : Soil structure denotes the arrangement of soil particle. The air and water relationships of a soil depend on its structure. Hence, soil structure has been regarded as the key to soil fertility as it directly influences many of the physical properties. A well developed structure increases porosity, water holding capacity and microbial activity. A soil could be classified based on its structure as given below :

Classification of soil structure

Structureless	:	single grain structure eg. sand
Massive	:	Sandy loams and loams eg. wet land puddle
Platy	:	platelike eg. Mica
Prismatic	:	Prism like/columnar eg. soils of semi arid and arid soils
Blocky	:	cube like eg. sub - soils of humid forest area
Granular	:	porous & very porous eg. black cotton soil (most desirable)

Particle density : The weight per unit volume of the solid portion (excluding pore space) of soil is called particle density and expressed as gms/cm^3. A generally accepted value of particle density for the normal soils is 2.65 gm/cm^3. The particle density is higher is

---

* Former Senior Advisory Officer, UPASI Tea Research Sub-station, Vandiperiyar. Presently with T. Stanes and company Limited, Coimbatore - 641 018.

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large amounts of heavy minerals (magnetite, hematite) are present. If soil is rich in organic matter the bulk density may be lower than the average (peaty soil 1.7 to 2.1).

Bulk density : Bulk density of soil is the weight per unit volume of dry soil including pore space and expressed as gms/cm^3. The bulk density varies indirectly with the total pore space present in the soil and gives a good estimate of the porosity of the soil. Generally soils with low bulk density have favourable physical condition and soils with high bulk densities exhibit poor physical condition. The bulk density of sand is 1.7 and loamy soil is 1.45.

If bulk density of soil is known, its weight can be calculated.

The average weight of soil to a depth of 30 cm over an area of one hectare approximately weighs about 3.92 million kg to 4.48 million kg.

Porosity : The space in between the soil particles are known as the pore space and the amount of pore space in a soil is known as porosity.

Soil porosity may be defined as the percentage of soil volume which is not occupied by the solid particles.

The pore space is mainly dependant on the size and arrangement of soil particles. The smaller the size of the particles the more is the pore space, eg. clay soil possess maximum pore space. The porosity of soils can be calculated as follows :

Percentage pore space =
(porosity)

$$100 - \frac{[\text{Bulk density}]}{[\text{particle density}]} \times 100$$

From sandy soils to clay soils the pore space varies from 32 to 50 per cent. The pores are divided in to two classes namely macro and micro pores. Macro pores (non-capillary) allow ready movement of air and water and do not hold much water under normal conditions, eg. sand. Micro pores (capillary) can hold more water but the movement of air and water is restricted to some extent, eg. clayey soils. For ideal condition of aeration, permeability and water retention, a soil have about an equal amount of macro and micro pores.

Water holding capacity : Water holding capacity is the weight of water held by a given quantity of absolutely dry soil (dried at 105°C) when saturated. When a soil is saturated with water i.e, after the free flowing water has drained away, it is said to be at its moisture holding capacity. The moisture holding capacity of any soil varies with texture and organic matter content. The finer the texture and greater the organic matter content, the higher the moisture holding capacity. The value is expressed as percentage and is a useful index to measure irrigational need of soil.

Colour : Soil colour is indirectly indicative of many other properties. Black soil may generally be regarded as fertile and white or grey soils are normally poor in organic matter. Red colour is generally suggestive of old, weathered, well drained soils such as lateritic soils. Brown colour is the most common which is due to a mixture of organic matter and iron oxides.

CHEMICAL PROPERTIES

Soil Colloids : The most active portion of the soil are those in the colloidal state. There are two distinct type of collodial matter viz. inorganic and organic, exist in intimate intermixture. The inorganic is present almost exclusively as clay of various kind, the organic is represented by humus. Nutrient elements in the soil are freely exchanged among the surfaces of plant roots, clay and humus. The nutrient exchange capacity varies directly with the amount and kind of clay or humus in soil.

Cation exchange capacity : The interchange between a cation in a solution and another cation on the surface of any surface active matter such as clay or organic matter is known as cation exchange (positive charged — H, Ca, Mg, Na, K & NH_4). The sum total of exchangable cations that a soil can adsorb and is expressed in milliequivalents per 100 g of soil or clay is known as cation exchange capacity. The cation exchange capacity varies according to type of clay minerals

Table - 3 : Cation exchange capacity of clay minerals

Clay mineral	CEC m.eq./100 g of clay
Kaolinite	2 to 15 (present in tea soils)
Montmorillonite	70 to 150
Illite	20 to 40
Humus	200

The uptake of nutrients is controlled by the exchange capacity of the soil (clay) as well as the roots of the plants.

Humus or organic matter : Organic matter includes plant and animal residues at various stages of decomposition, cells and tissue of soil organisms and substances synthesised by the soil organisms. Highly decomposed organic matter in soil is known as humus.

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The cation exchange capacity of humus is around 200 m.eq/100 g of soil. The organic matter content predominantly contributes for high CEC values which influences the nutrient fixation and availability.

Reaction : The degree of acidity or alkalinity of a soil is termed as soil reaction and expressed as pH value. The reaction of the soil is very significant in crop production and soil management practices. The soils may be acid, neutral or alkaline in reaction and can be classified based on the pH values (Table - 4).

Table - 4 :
Soil reaction (pH) - Classification

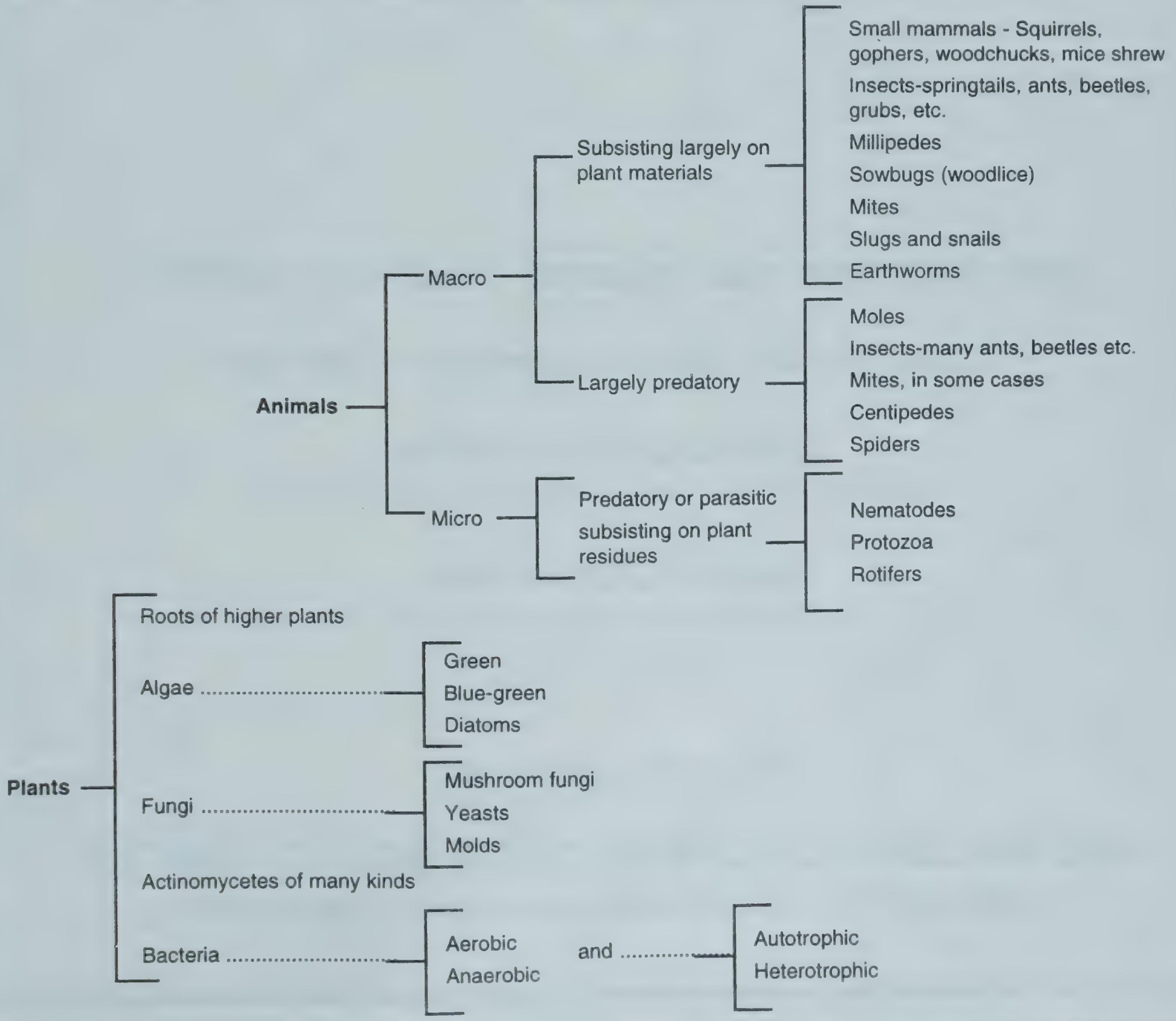
Reaction (pH)	Acidity Status
Below 4.5	Extremely acidic
4.5 to 5.0	Very strongly acidic
5.1 to 5.5	Strongly acidic
5.6 to 6.0	Medium acidic
6.1 to 6.5	Mildly acidic
6.6 to 7.3	Neutral
7.4 to 7.8	Mildly alkaline
7.9 to 8.4	Moderately alkaline
8.5 to 9.0	Strongly alkaline
Above 9.0	Very strongly alkaline

Nutrient status : The chemical analysis of soil will determine the quantities of plant nutrients present in the soil and also the availability of the same to the plant growth. This should be undertaken as a routine and nutrient management should be planned depending on the crop. The soil testing is an important method to evaluate the fertility of soil.

BIOLOGICAL PROPERTIES

A large number of organisms live in the soil and a greater proportion of these belong to plant life. Most soil organisms, both plant and animal are so minute and can be seen only through microscope.

The chart showing more important group of organisms present in the soil are given in Table - 5.


Animals
Macro
Subsisting largely on plant materials
Small mammals - Squirrels, gophers, woodchucks, mice shrew
Insects-springtails, ants, beetles, grubs, etc.
Millipedes
Sowbugs (woodlice)
Mites
Slugs and snails
Earthworms
Largely predatory
Moles
Insects-many ants, beetles etc.
Mites, in some cases
Centipedes
Spiders
Micro
Predatory or parasitic
subsisting on plant residues
Nematodes
Protozoa
Rotifers
Plants
Roots of higher plants
Algae
Green
Blue-green
Diatoms
Fungi
Mushroom fungi
Yeasts
Molds
Actinomycetes of many kinds
Bacteria
Aerobic
Anaerobic
and
Autotrophic
Heterotrophic

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Macro animals : The large animals of the soil are mainly :

Rodents Insects Millipedes	Burrowing - aeration and drainage
Sowbugs (wood lice) Centpedes Spider Earthworm	Feed on plant tissue - initiate the decomposition

The activity of most of these are often beneficial to the soil condition. These animals not only incorporate organic matter in to the soil but also their burrows play a useful role in aeration and drainage. The insects, millipedes, slugs, snails, spiders, mites etc. often use more or less undecomposed plant tissue as food and thus initiate the process of decomposition that are continued by soil microorganisms (bacteria and fungi). Earthworm activity in soil improves the physical and chemical properties of soil.

Micro animals : The microscopic animal life in soil are Nematodes and Protozoans.

Nematodes are microscopic worm and they are classified according to their activity in to :

Omnivorous :
Most comon and live mainly on decaying organic matter

Predaceous :
Prey on soil fauna including other nematodes

Parasitic :
Infest plant root causing crop loss

Protozoa are microscopic animals that feed mainly on bacteria. They influence the balance of microbial population in the soil.

Plant life : The plant life of the soil may be considered under the following five heads :

Roots of higher plants	Macro
Algae Fungi Micorrhiza Actinomycetes Bacteria	Micro

Roots of higher plants : As a source of organic matter, the roots of higher plants are of supreme importance. They supply more organic matter than the other organisms combined. The dry roots left in the soil is a source of dead tissue for nutrition of soil microbes. The exudates from the root and the various compounds formed at the root surface play a very important role in nutrient availability. The number of organisms in the immediate root zone is greater than elsewhere in the soil.

Algae : Soil algae are microscopic chlorophyll bearing organisms and are divided into three general groups.

1. Blue-green
2. Green
3. Diatoms

Soil algae in vegetative form is present in the upper layer of soil and in sub-soil mostly present as resting spores or cysts.

Algae contribute some to the organic matter content of the soil and play an important role in fixing atmospheric nitrogen.

Fungi : Soil fungi may be parasitic, saprophytic or symbiotic. Parasitic fungi produce plant diseases (root rot, wilt etc.) saprophytic fungi obtain their energy from decomposition of organic matter and symbiotic fungi live on the roots of certain plants in that both fungus and plants are mutually benefitted.

Fungi are especially useful in the soil because they break down the resistant cellulose, ligin and gum, as well as the more easily decomposed sugar starches and proteins. A large part of the decomposing humus consists of dead remains of fungal hyphae.

Micorrhiza : Mycorrhiza meaning 'fungus root', is the name given to a symbiotic association of fungal mycelium and the roots of higher plants. It is presumed that mycorrhiza aid the host plant in the absorption of certain nutrients.

There are two general types of mycorrhiza based upon their manner of growth viz. Ectotrophic and Endotrophic.

Ectotrophic mycorrhiza : Grow as thread like filaments into small roots between the root cells, but not into the cells. Their function appears to help the tree roots absorb more nutrients by increasing the absorbing surface. Trees that have the ectotrophic type of micorrhiza are the pines, chestnut, oaks.

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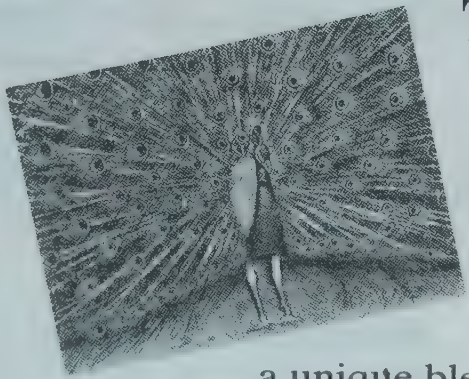

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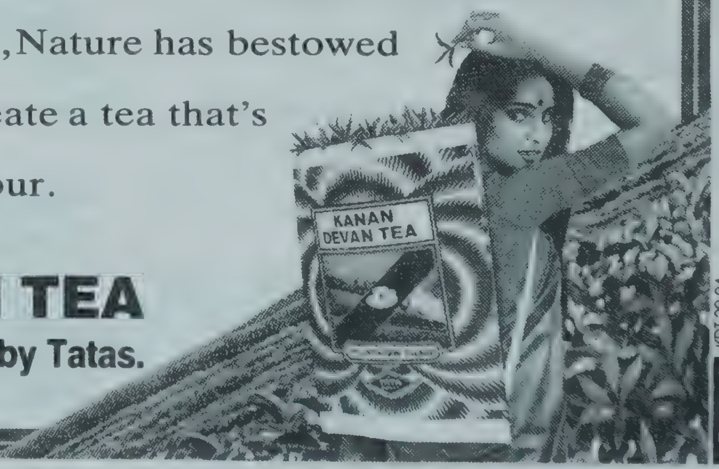

In Endotrophic micorrhiza the fungal hyphae penetrate the plant root cells. Upon dying micorrhizal tissues are absorbed and utilised by the growing trees. Many cultivated crops like corn, onion, strawberries, and trees like apple and archid are often have endotrophic mycorrhizal association.

The wide spread occurence of micorrhiza is of great partical importance. The growth of micorrhiza infected plants is superior to that of uninfected plants. It is known that increased efficiency of nutrient uptake by micorrhiza and their occurance in soil suggests benefits of considerable magnitude.

Soil Actinomycetes : Actinomycetes are taxonomically are morphologically related to both fungi and bacteria but have recently been classified as bacteria. They are charecterised by branched mycelia, similar to fungi and resemble bacteria when the mycelia break into short fragments. Actinomycetes produce antibiotics eg. streptomycin, Terramycin, Neomycin.

Actinomycetes are found in fairly large quantities in soil. They thrive best when soil is neutral to slightly acidic in reaction, when soil moisture is good, and when there is ample fresh organic matter. The primary function of actinomycetes is decomposing organic matter especially cellulose and other resistant forms and liberating nutrients from them.

Soil Bacteria : Bacteria are single celled organisms and one of the simple and smallest of life known. They multiply by elongating and dividing into two parts. They have unlimited capacity to multiply and is extremely important in soils. Soil reaction below 6.0 pH limits bacterial activity.

Soil bacteria are commonly classified under two heads namely autotrophic.

Autotrophic bacteria derive their energy from the oxidation of mineral constituents, such as ammonium, sulphur and iron and the carbon from carbon-dioxide. The most important groups of autotrophic bacteria are those which oxides ammonia to nitrite to nitrate. These groups are known as nitrifiers or nitrifying organisms.

Conversion of Ammonium into nitrite is done by Nitrosomonas and oxidation of nitrites to nitrates is done by nitrobacters.

Heterotrophic bacteria derive their energy and carbon both directly from the soil organic matter. Functionally they bring about mineralisation of organic matter through hydrolysis and oxidation and release nitrogen, phosphorous and other nutrients in forms available to plants. Fungi and actinomycetes are also heterotrophic in charecter. Nitrogen fixing bacteria are another important class of heterotrophic bacteria.

AMMONIFICATION

The transformation of organic nitrogenous compounds into ammonia is called as ammonification. The ammonification occur as a result of action of enzymes produced by micro organism (bacteria, fungi and actinomycetes).

Protien — Amino acids — ammonium salts
(Heterotrophic organisms)

NITRIFICATION

Nitrification is an aerobic process involving production of nitrates from Ammonium salts.

$$\text{Ammonium salts} \xrightarrow{\text{Nitrosomonas}} \text{Nitrite} \xrightarrow{\text{Nitrobacter}} \text{Nitrate}$$

BIOLOGICAL NITROGEN FIXATION

Biological nitrogen fixation is one of the important sources of Nitrogen for soils. There are two main classess of organisms that fix atmospheric nitrogen, viz. symbiotic and nonsymbiotic.

Symbiosis is defined as living together in intimate association of two dissimilar organisms, the cohabitation being mutually beneficial.

Symbiotic nitrogen fixing bacteria : eg. Rhizobium spp.

Normally associated with root nodules of leguminous plants.

Nonsymbiotic nitrogen fixing bacteria :

Azotobacter is the most important aerobic (in presence of oxygen) nonsymbiotic organism responsible for nitrogen fixation in soil.

Clostridium is less efficient and work in anaerobic (when oxygen supply is absent or deficient) conditions.

SOIL FERTILITY

Soil fertility and soil productivity are often used synonymously but there is a definite distinction between these two words.

Soil fertility may be defined as the ability of the soil to provide all the essential plant nutrients in

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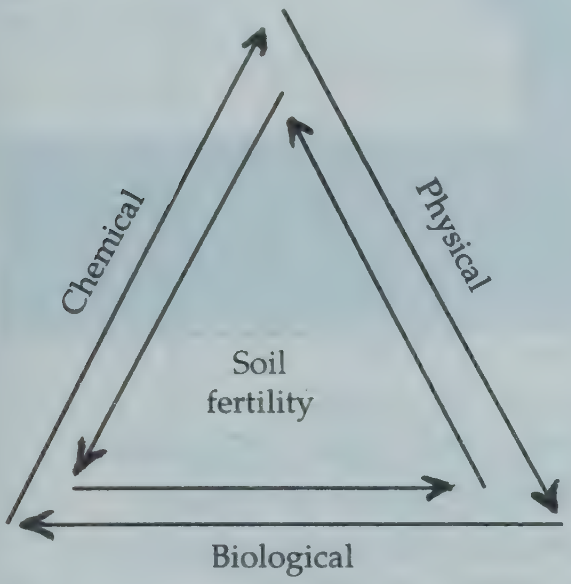
available form and in a suitable balance.

Soil productivity is the ability of the soil to produce crops. Thus soil fertility, good management practices, availability of water suitable climatic condition contribute towards soil productivity. The physical, chemical and biological properties are interdependant and they all collectively contribute to the fertility of soil.

The importance of physical, chemical and biological properties could be illustrated by the diagram given below :



The physico-chemical studies of soil are essential in understanding the fundamental soil characterstics. They play an important role in the retention and release of plant nutrients. They are also useful in formulation of fertilizer management and agronomic practices in crop cultivation. The biological properties of soil play a vital role in their influence on crop production. The soil flora and fauna is responsible for decomposition of organic residues and in the process leave behind compounds that are useful to the plants. An outstanding contribution by soil micro organism is the fixation of atmospheric nitrogen in the soil.

IMPORTANT FACTORS AFFECTING SOIL FERTILITY

Soil reaction : Soil reaction is the most important single characteristic influencing many physical, chemical and biological properties of soil. Suitability of soil as a medium for growth of plant and desirable micro organisms depends on whether the soil is acidic, neutral or alkaline. Hence, soil reaction should be maintained at the ideal level suitable for a particular crop.

Organic matter : Organic matter influences physical, chemical and biological properties of soil despite the small proportion present in the soil. It commonly accounts for at least half the cation exchange capacity of the soils and is perhaps responsible more than any other single factor for the stability of soil. Moreover it supplies energy for micro organisms whose activities are of vital importance in soil dynamics.

Hence, management of soil organic matter status and soil reaction (pH) are the two most important characteristics that govern the fertility of soils.

ACKNOWLEDGEMENT

I thank Mr. Siby Mathew, Assistant Advisory Officer, Tea Research Sub-station, Vandiperiyar for his assistance in compiling this paper.

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Physical and chemical characteristics of tea soils of South India

Constituents	Wynaad	Nilgiris	Anamallais	High range	Central Travancore	South Travancore
Organic matter %	2.0	3.20	3.14	3.49	2.56	2.09
Cation Exchange capacity meq%	10.000	10.000	8.000	8.000	9.000	6.000
Bulk density	0.900	1.080	1.060	1.070	1.070	1.000
Particle density	2.240	2.280	2.060	2.080	2.100	2.100
Pore space ml/100 cc of soil	64.400	55.800	54.000	53.000	58.000	51.200
Water holding capacity %	80.000	57.000	56.000	58.000	61.000	52.000
Permeability	Good	Good	Good	Good	Good	Good
Soil texture	Heavy Clay loam to clayey	Clay loam to clayey	Loams	Loams	Loams	Loams/ Sandy loam

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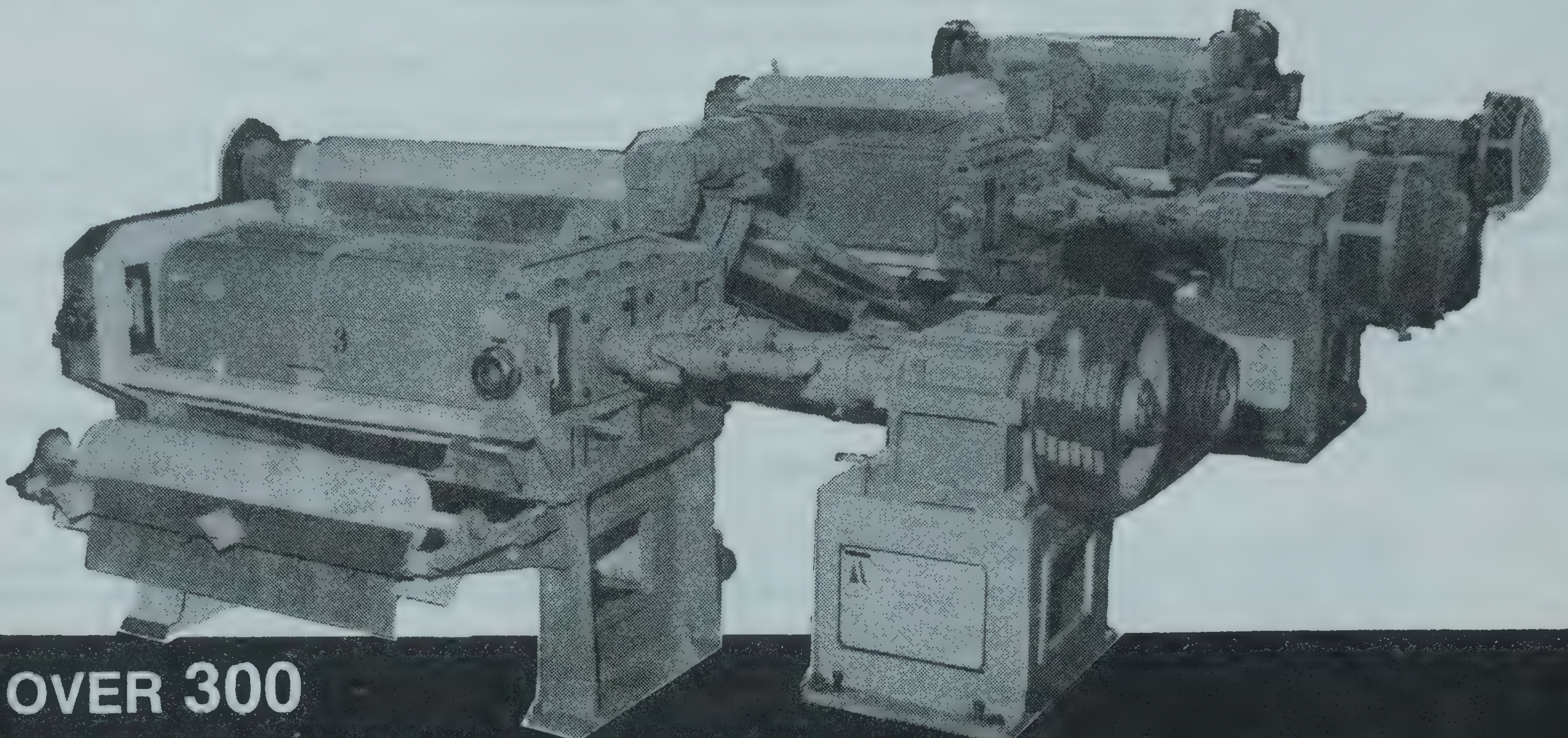

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NEED FOR A NEW REACH-OUT MODEL
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by

SUBHASH SHARMA

As we approach the 21st Century, a new approach is needed to create a new set of education and training institutions. This approach is required for improving the strategic "TIP" (technology, information and people) in various sectors of the economy, in the context of new changes. In general, a new breed of managers have to put new innovations in action with a view to create a strategic edge with a sharpened TIP.

The revolution in information technology has also made it possible to improve the strategic TIP to our advantage. Through the information highway, the spatial linkages have shrunk and accessibility to information has become easier. These changes also have interesting implications for creation of new types of educational and training institutions that can act as a support to industry's competitive edge.

The reach-out model provides the foundational premise for such new innovations. Traditionally, management education and training institutions have been built through a high level of investment in physical infrastructure. This generally reduces the availability of resources for academic infrastructure. Maintenance of huge physical infrastructure creates its own unique problems.

It has been the experience of many institutions, particularly in our country, that precious faculty time gets wasted in looking after the problems that arise from maintenance of physical infrastructure. Union problems apart, the overhead cost of maintaining high investments in physical infrastructure has been increasing over a period of time. In the era of resource crunch, the sustainability of an institution may get severely affected due to non-availability of adequate resources.

In the reach-out model, emphasis is on academic infrastructure and faculty resource rather than on physical infrastructure. Like the information highway, the institution reaches out to its client system that may be spread out miles apart in geographical positioning. The reach-out model facilitates close interaction with the client system. It also ensures that researchers have greater opportunities to test their ideas in field situations and to innovate new ideas from field experiences. Thereby, it facilitates a theory-to-practice and practice-to-theory approach to idea-generation and knowledge-building.

Since the emphasis is on development of faculty and methods of reaching out rather than physical infrastructure too excessive but should be sufficient enough to facilitate smooth functioning of the reach-out concept. This reduces the overhead expenses for maintenance of physical infrastructure that heavy investment-oriented institutions need in future and find difficult to sustain it.

Any resources so conserved can be more effectively put to use in bringing the new innovations to the field. Greater investment in academic infrastructure would bring better pay-off for the benefitting sector as reaching out gets facilitated.

The plantation sector in India offers a unique opportunity for the reach-out model of creating a sustainable institution. Passing through the earlier phases of romantic and scientific era, the plantation sector is at the threshold of a new innovative era arising

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from innovations in biotechnology, increased liberalisation and globalisation, quality consciousness, as well as structural changes in the ownership patterns. These changes have necessitated forward thinking for keeping up the strategic edge of the plantation sector.

The uniqueness of the Indian plantation sector also lies in its geographical spread in South India and in the North East. South India has a diversity of plantations dominated by a large number of individual growers. The North East has relatively greater presence of corporate organisations in the tea segment of the plantation industry. Each subsegment has its own unique TIP and methods of management.

The need to bring the new innovations in managing technology, information and people to the doorsteps of planters is urgent, particularly in view of the new marketing era that has dawned in the plantation sector. Such a challenge can be met through a reach-out model because it provides easier access to training to larger numbers. The other models of institutions tend to cater to a select few and are based on the trickle-down assumptions.

The reach-out model is also more suitable to those segments of Indian reality wherein the management of the strategic TIP can be improved only by taking the new ideas to the large numbers who are spread out spatially and who collectively contribute significantly to the productivity and production.

The plantation sector also enjoys a uniqueness in terms of availability of local infrastructure in the form of planters' associations. They have been acting as facilitators in the implementation of the reach-out concept.

The reach-out model is consistent with the latest advances in information technology, customised education and lean organisations. It also makes an extensive use of information technology to reach-out its client system. It is also consistent with the think-tank model of institutions. Its essence is captured through the phrase "small but significant". It is relatively smaller in its physical infrastructure but significant in contribution to training and other academic activities.

The Indian Institute of Plantation Management (IIPM), Bangalore, started at the initiative of the Government, the commodity boards and the plantation industry, is one of the new management schools that envisages its corporate growth plant around the new concept of the reach-out model. Through its short terms executive programmes, the institutive has been providing a forum to the plantation executives and owner-managers to exchange and transmit new ideas in management of technology, information and people with a view to meet the challenges of the new marketing era.

Through interactive brainstorming workshops, it has been bringing the diverse market players to a common platform with a view to objectively look at the futuristic scenarios and strategic competence of the Indian plantation sector. The institute's blueprint evisages longer-duration programmes for young entrants, plantation executives and owner-managers, including the estate inheritors specifically suited to the needs of the Indian plantation sector.

Starting from a shunya or scratch, the institute is in the process of acquiring a critical mass to effectively implement the reach-out model with a view to realise the dream of creating an exclusive management school for planters based on a new model.

— *The author is director of the Indian Institute of Plantation Management, Bangalore. He is a graduate of the Indian Institute of Management, Ahmedabad, and holds a Ph.D. from the University of Southern California, Las Angels.*

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FIELD PERFORMANCE OF BICLONAL SEED STOCKS

S.K. GOVINDASAMY*

To-day's main challenge confronting a tea planter is to increase productivity per unit area. With proper care and scientific bush management, we are able to increase our productivity to a certain extent. Beyond this comes proper and improved planting material. Unless the existing areas are replanted with improved materials, it will be difficult to keep pace with the stiff competition from other tea growing countries. It should be kept in mind that what we plant to-day will have its bearing for another 50 years or more. Therefore, the use of proper material plays a major role in deciding the productivity of the Indian Tea Industry.

In this backdrop, a case study was done in an estate in Nilgiris located at an elevation of 6500 feet. This particular estate consists of Assam, China and Clonal teas. The yield figures reveal as follows :

Assam hybrid seedling tea	2,993 kg/ha
China hybrid seedling tea	1,621 kg/ha
Clonal tea	2,215 kg/ha

Based on the superior yield performance of Assam hybrid seedling tea, it was decided to go in for biclonal seed from Tocklai Tea Research Association. Incidentally, biclonals are hybrid of two clones.

An experiment was laid down in the estate consisting of four biclonal seed stocks, namely, 464, 462, 492 and 490. For comparison, the South India clone, B/6/61 was planted in a separate plot adjoining these biclonal plots. These were planted in November 1988 at a spacing of 4 x 2½ x 2 feet and the yields were recorded from 1990-91 to 1992-93 (Table 1).

The biclonal stock, 464 has given the highest yield for three consecutive years when compared with the other biclonals and the clone B/6/61.

Besides recording the yield, in order to ascertain the tea making capabilities, the teas were manufactured separately and were tasted periodically in the estate as well as by the brokers. The details of assessment are given in Table 2.

The tasting reports indicate that the biclonal stock, 464 is performing well in liquors. incidently, one of the parent clones of the biclonal seed stock 464 is TV 1, which is rated to be the best quality clone in Assam.

The basic differences between clonal and seed population are :

	Seed in Nursery	Clonal in Nursery
1.	Easy to grow	Requires special Nursery Techniques
2.	Hetrogenecity of Soil in nursery not reflected in growth	Hetrogenecity reflects in rooting
	Field performance	**Field performance**
3.	Grows in a wide range of environments	Mostly specific
4.	Average response to shade and manure	Selective
5.	Plant to plant variation in pest and disease attack	Susceptible or resistant
6.	Drought tolerance is average because of the initial advantage of the tap root	Yes or no - Lacks tap root system

TABLE 1 : Yields of biclonal seed stocks

Seed stock/ clone	(Yield kg/ha) 1st year 90-91	2nd year 91-92	3rd year 92-93
1. Seed stock 464	1050	1931	1810
2. Seed stock 462	511	1515	1272
3. Seed stock 490	810	1679	1227
4. Seed stock 492	903	1242	801
5. B/6/61 (UPASI-9)	766	1652	1507

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* Kodanaad Tea Estates Company, Kotagiri.

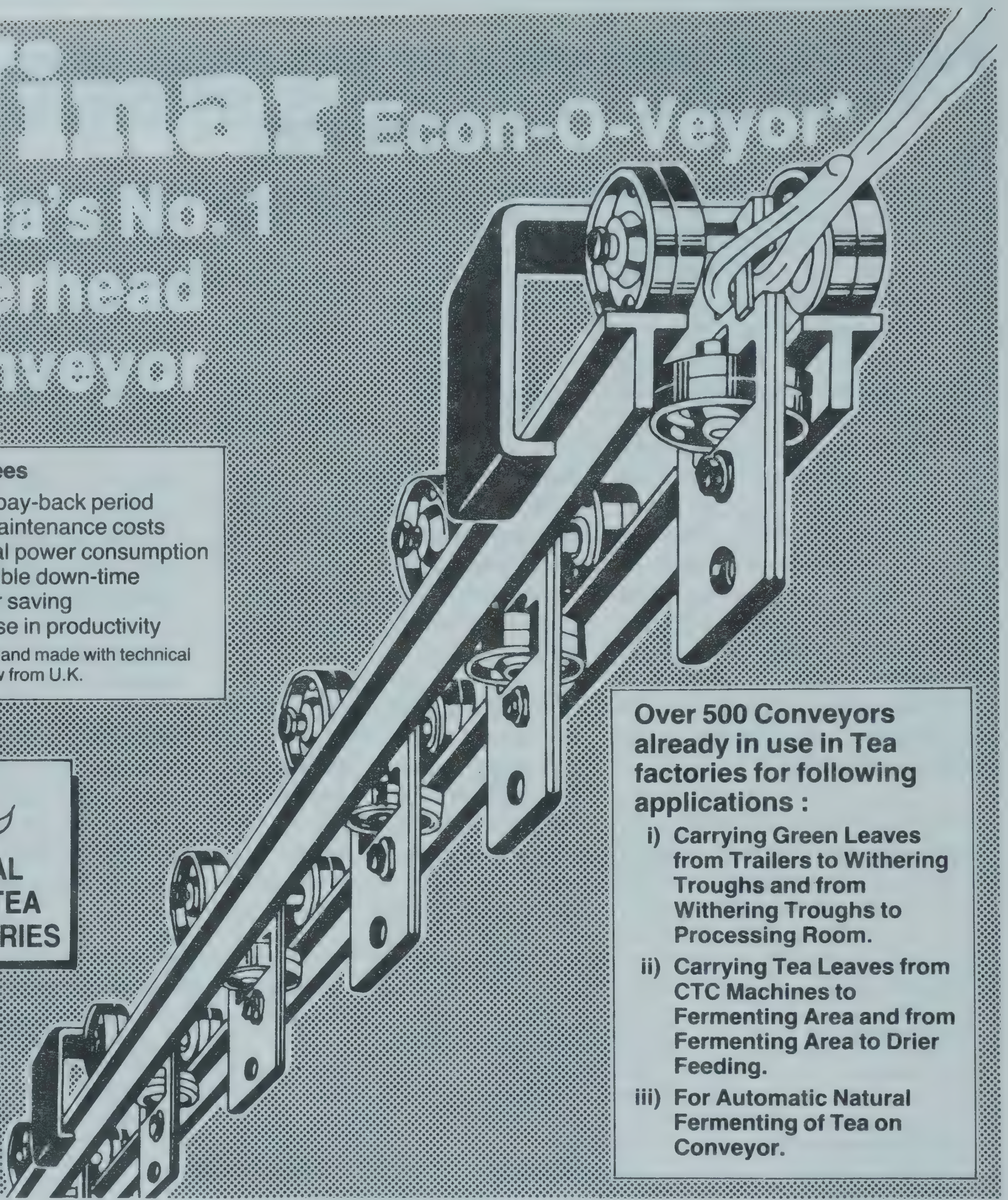

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TABLE 2 : Tasting reports

1st tasting on 02-12-1990			Liquor characteristics		
	Details		**Brokers** (Coonoor)	**Estate**	**Brokers** (Kochi)
A	CR 6017 (Best quality clone in South India)		3	1	3
B	Biclonal stock 464		(1)	2	2
C	Assam		4	3	4
D	China		2	4	1
2nd tasting on 27-12-1990					
1	6017 CR		4	2	—
2	Assam		3	3	—
3	Biclonal stock 464		(1)	1	—
4	Dangri Manipur		5	5	—
5	Assam		3	4	—
3rd tasting on 21-12-1991					
1	Biclonal	BOP	(1)	1	—
2	Assam	BOP	2	2	—
3	China	BOP	3	3	—
4	Biclonal stock 464	BOPF	(1)	2	—
5	Assam	BOPF	2	1	—
6	China	BOPF	3	3	—
4th tasting on 14-12-1992					
1	Biclonal stock 464	BOP	(1)	1	—
2	Assam	BOP	2	3	—
3	China	BOP	3	2	—
4	Biclonal stock 464	BOPF	(1)	1	—
5	Assam	BOPF	2	1	—
6	China	BOPF	3	2	—

Now the question arises whether to plant seed stocks or clones. It varies from estate to estate which the estates themselves have to find out after taking their present yield figures, etc., into consideration and decide on their future planting material. But it is desirable of course to have some areas in the estate with popular biclonal teas. Before doing so, a word of caution is necessary. It is always prudent to obtain seeds personally from the registered tea gardens in Assam after inspecting their seed bearers.

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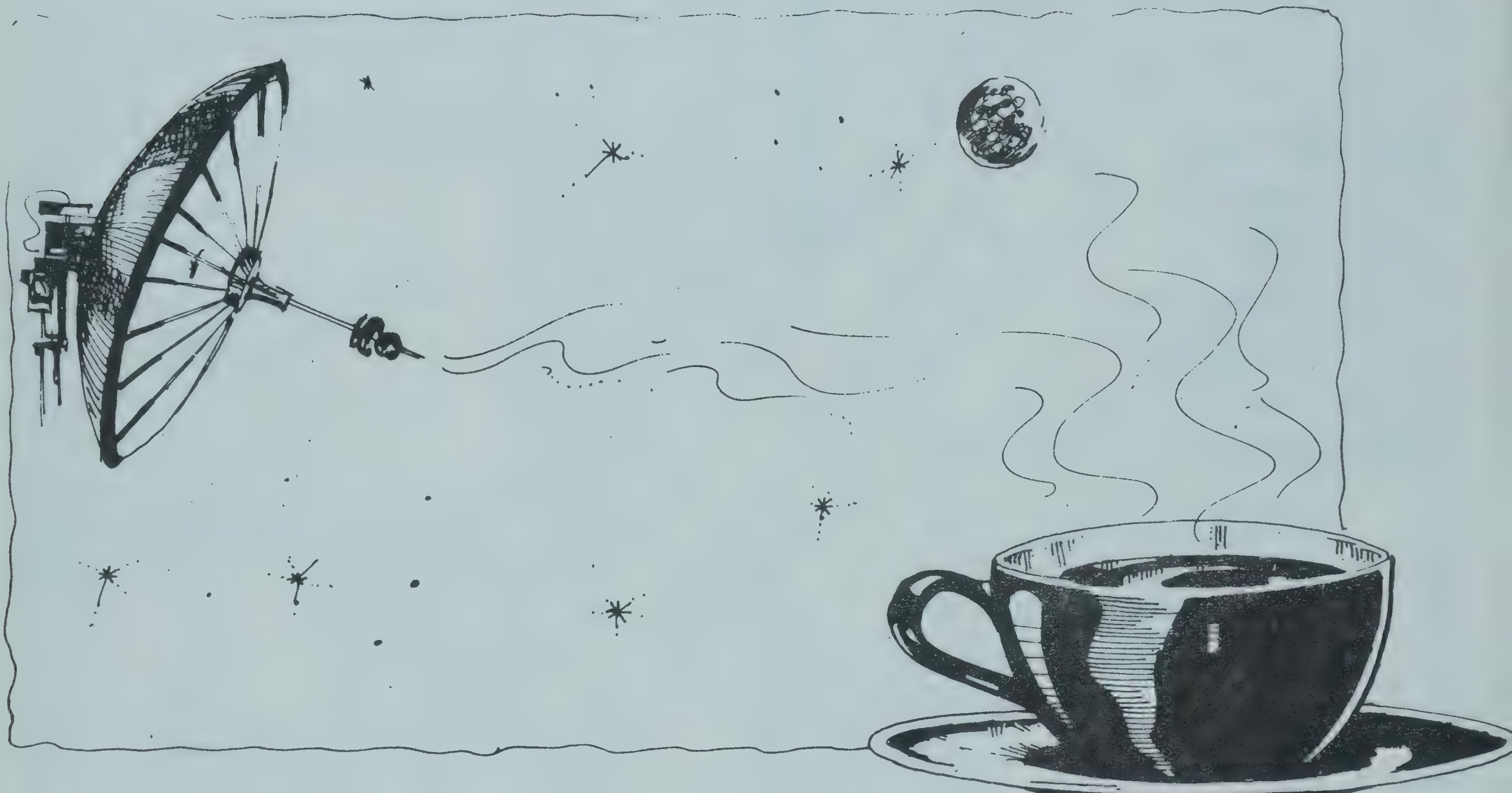

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CASE FOR ORGANIC FARMING IN TEA

India may lose a big chunk of its tea market abroad, if it does not take note of an important trend in the West – organic farming is in, while synthetic pesticides are out.

With pesticide residuce in food products becoming an internationally important issue, import of food products from the Third World countries may virtually be controlled by this factor alone, say tea experts.

Increasing global awareness about the pollution and health problems caused by chemical pesticides and fertilisers, and benefits of organic farming based on natural plant and animal-based products, has created a high demand for organically grown agricultural products throughout the world.

Dr. Balamani Bezbaruah, Assistant Director at the Regional Research Laboratory (RRL), Jorhat, says with the organically grown tea fetching a higher price abroad, India can do well to adopt organic farming using natural plant growth-promoting microbes present in the soils of its vast tea plantations.

Beneficial microbes can be isolated selectively from tea plantations, nurtured and re-introduced in areas, where they have been depleted due to excess use of chemicals.

Such microbe cultures can be a useful supplement to replacing synthetic fertilisers with organic manure such as farm-yard manure. The latter is a gigantic task, which needs not less than 25 tonnes of farm-yard manure to provide 100 kg of nitrogen per hectare, and there are over 400,000 hectares under tea cultivation in India.

Based on research findings at RRL., Dr. Bezbaruah has recommended to tea planters how to use natural soil microbes to grow tea organically, in a new book "Plant and soil health through soil microbial management in tea plantations". RRL, is a laboratory under the Council of Scientific and Industrial Research (CSIR).

Organically grown tea will improve not only the market for Indian tea abroad, but also the soil condition and ultimately production, says Dr. Bezbaruah.

The concept of organically grown tea has also received support from the President of the Calcutta-based Indian Tea Association, who says in the book that the extremely low pesticide residues prescribed by the European countries can pose serious problems for countries that do not drastically reduce their use of chemical pesticides.

According to Dr. Bezbaruah, in the case of perennial crops such as tea, farmers do not practise crop rotation or allow the land to lie fallow for some time. As the same crop is grown throughout the year, the same type of pesticide is introduced into the soil again and again.

During the peak growing season, there is a tremendous pressure in plantations to control weeds, insects and fungal pests, to harvest the green leaf and process it immediately to produce high-quality tea.

Dr. Bezbaruah cautions that the side-effects of chemical pesticides are increasingly over-shadowing their benefits, and disturbing the natural microbe populations in the soil.

RRL studies have revealed another danger — several tea plantations contain large amounts of the same type of organisms which can withstand high pesticide amounts.

Advanced countries such as Japan and the US are facing such "problem soils", where excessive build-up of microbes that can withstand and degrade pesticides make the chemical ineffective long before it reaches the target pest.

A more effective strategy will be bio-control — using natural organisms to kill pests, according to Dr. Bezbaruah. The Jorhat laboratory has identified and patented some commercially viable solutions of bacterial strains that protect roots, stems and leaves of tea plants from fungal infections.

The RRL scientist says soil fertility can be improved with a plant growth promoting solution prepared from natural beneficial bacteria specifically for tea plantations. Selected beneficial strains of bacteria could be introduced through seeds or vegetative parts such as stem cuttings, she said.

Tea planters can exploit "nitrogen-fixing" strains of tiny blue-green algae and bacteria that convert atmospheric nitrogen into a usable form. Of special interest is a nitrogen-fixing bacterium called

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rhizobium that forms nodules on roots of specific legumes and improves the nitrogen content of soil.

Dr. Bezbaruah also recommended that tea planters improve the quality and quantity of organic matter in the soil by using soft herbs as a mulch, allowing leaves of tea bush prunings to fall on the soil and using specific bacterial cultures that rapidly form manure.

She has listed the specific fungi and bacteria that can break down lignin and cellulose present in soil litter to give carbon, as well as those that improve the phosphorus and sulphur content of soils in tea plantations. **PTI**

— BUSINESS LINE

VIEWS

A PACKET TEA IMPORTER SPEAKS

In the past few years, at the meeting of different tea associations in the country and the Tea Board, a lot have been deliberated on pesticides residue limits and unethical trade practices of a few Indian tea exporters. At the available opportunities, the Ministry of Commerce has warned the producers/exporters about the far-reaching consequences of their behavioural pattern on the country's tea export. It is not known, however, the extent such deliberations could rouse good sense and scrupulosity in them. But from a letter of Mr. Amlan Kusum Das, Managing Director, Indian Tea Co., London, published in The Statesman, Calcutta Edition, it appears that the county's tea producers/exporters have scant respect to the help of the tea industry and business. The appropriate authorities, on the other hand, are not also keen to see that healthy practices are followed meticulously.

The letter of Mr. Das is, as such reproduced to correctly estimate what an importer intends to say all about the Indian tea producers'/traders' activities :

"As one of the large importers of Indian packet tea in the U.K., I appreciate the concern of Mr. Pranab Mukherjee on the use of pesticides in tea plantations, expressed in his speech on February 8 at the Calcutta Tea Traders' Association.

There has been a lot of complaints for a long time against this practice abroad as a result of which India is losing its market. We have discovered insects of various types and even long metal nails; a large number of service tea bags in the packet instead of tea bags; shortage of contents in the packets; an exceptionally large number of cartons are dented; and caddies are printed upside down. All these indicate that packaging is done in unhygienic conditions, and without care and supervision. On several occasions, sub-standard tea has been sent against payment for the best quality tea.

Time and again, we have drawn the attention of the Union Commerce Ministry and the Tea Board's office in London about these unfair practices. But it appears that the authorities are unable to take action against unscrupulous suppliers.

I draw the attention of the Commerce Ministry to the violation of our copyright on design and artwork on caddies by Indian suppliers and caddy manufacturers. This is against business ethics and the GATT agreement, to which India is a signatory".

AMLAN KUSUM DAS.

Extract from *"The Assam Review of Tea News."*

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OPINION

INSTANT POLICY

The commerce ministry's decision to allow a 100 per cent free sale quota (FSQ) for small coffee growers and a 70 per cent FSQ for the rest is consistent with the tendency among policy makers for coffee not to look beyond the short term. Against the current pressures on the industry, the decision will be considered pragmatic. The Coffee Board has been finding it difficult to enforce the earlier 50 per cent free sale quota. By making the FSQ for small growers 100 per cent, it has acknowledged its inability to monitor the production and pooling of small growers. Indeed, though all growers holding more than 10 hectares are now expected to pool 30 per cent of their production, it will be no surprise if pooling is restricted to the very large plantations which are easier to monitor. This limited pooling can be used to ease the pressure on domestic coffee prices. The 20,000 tonnes that is now expected to be pooled should be sufficient for the Board to intervene effectively enough to prevent a runaway increase in coffee prices in an election year.

The difficulty with this strategy is that it can only deal with a situation where coffee prices are rising in both the domestic and world markets. In the event of coffee prices crashing, as they have done in the not too distant past, the Board will no longer be able to play its old role. With market-determined prices, the Board cannot now keep domestic prices at higher levels where they can cross-subsidise growers when world market prices fall. Limited pooling will also eat into the resources of the Board for activities like R & D. While the Coffee Board's approach to goals such as protecting the small grower and high quality R & D may have had serious limitations, these objectives themselves matter. The coffee industry will need to develop alternative mechanisms to control the fluctuations in prices as well as generate resources for activities like R & D. The policies announced so far take the first step of dismantling a system that had outlived its utility, but, unless an alternative system is put in place, the roller-coaster ride that the coffee industry has witnessed over the last few years will continue.

— ECONOMIC TIMES

BIG STEP IN COFFEE

After months of uncertainty, the Government has finally made up its mind to grant 100 per cent free-sale quota to small coffee-growers whose holding is less than 10 hectares each and who account for 35 per cent of total production, while requiring larger growers, who account for just two per cent of all registered growers, to pool 30 per cent of their produce with the Coffee Board. On the face of it, the decision appears to be the happy outcome of a complicated balancing act meant to take care of the interests of different segments of the industry — growers, consumers, exporters and domestic traders. Inas-much as it is so, it should be welcome.

Under the new dispensation, the Coffee Board expects to get around 20,000 tonnes of coffee pooled by the large proprietary growers and corporates. This, when augmented by direct purchases by the Board from the market at prevailing prices (as envisaged by the new policy) should leave reasonable quantities of coffee at the disposal of the Board to enable it to influence market price trends. The Board believes that it can offer a pure coffee blend at the reasonable price of Rs. 115-125 a kg. Perhaps it can, at current international prices. However, if international prices harden, which seems likely, the Board's calculations can go awry. It would be naive to expect the Board to intervene to stabilise domestic prices since the Board's role is severely circumscribed by international coffee price movements. The best that it can do for the

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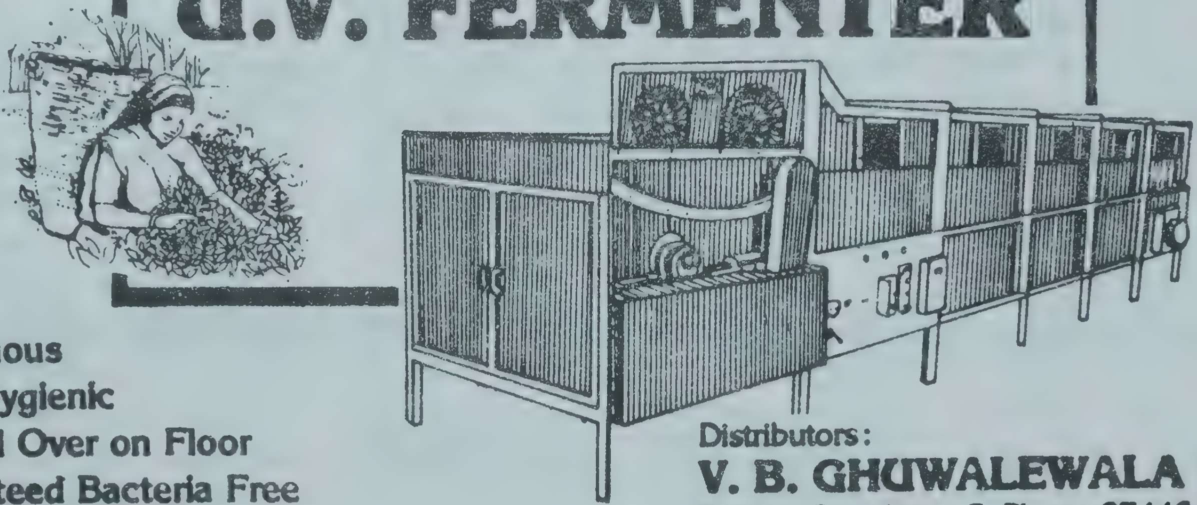

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domestic consumer is to keep its intermediation costs low and put pressure on private traders to keep their margins thin as well.

However, there could be a problem here too. Initially the Board plans to buy around 2,500 tonnes from the market, but may increase this quantity if the situation warrants it. The entry of the Government into the market through the Board as a buyer could easily push up market prices, so much so that the Board could end up achieving exactly the opposite of what it purports to do. However, when international prices crash, the Board could insulate the growers against unremunerative prices through its intermediation.

The new policy conveniently brushes under the carpet the ticklish issue of providing subsidised coffee to the poor in South India for whom the beverage is not luxury. It does not even pretend to address this issue which was once centre-stage when the growers offered (and immediately retracted thereafter) 5,000 tonnes to the public distribution system when the threat of an export duty loomed large on the horizon. Even the Coffee Board blend which is to be made available at the 'reasonable' price of Rs. 115 a kg. is unlikely to benefit the economically weaker sections for the simple reason that the Board outlets, which number no more than 52, are scattered all over the country and inconveniently located.

An issue that seems to have been overlooked by the new policy is that the Board is once again left without sufficient authority to discharge its responsibility of collecting the 30 per cent pool coffee from the large growers. Last year, the Board could collect only a quarter of what should have been pooled. The Chairman of the Board has in fact repeatedly pointed to the lack of any device which can be used to ensure partial mandatory pooling. In a regime where small-growers to pool with it. This may affect the Board's ability to intervene in the market and ensure that domestic consumers get their coffee at "reasonable" prices.

— **BUSINESS LINE**

THE CUP THAT DOESN'T CHEER

Indian tea is having a bad time and extreme weather conditions both in the north and south India seem likely to affect production of tea this year. Though there was a slight recovery in North India in March, production of the crop was expected to drop by 25 per cent in April are estimated to be around 10 per cent.

The crop is caught in a bind. It is exposed to the vagaries of nature and yet not fully recognised as an agricultural produce. For tax purposes, it is deemed to be both an agricultural produce as well as the product of an industry. The Centre and the growing States both have interest in the produce and tea industry insiders are right in saying that no other item has so many anomalies in the tax structure. The tea grower neither gets the benefit of a hundred per cent agricultural produce nor those that industries are entitled to. While weather takes its usual toll on the crop, the high rate of taxation, both from the Centre and the States, also has a crippling effect on efforts to boost production. Yearly production statistics indicate that there has been a gradual slowing down.

Last year, the producers were struggling to recover from the beating they received in the sudden collapse of the Russian market. This year again, the unfavourable weather has become a major concern for them. It is time the Government gave some attention to this not so negligible segment of the economy to bring it back to health. The States and the Centre must agree on certain basic areas of taxation. If that needs a constitutional amendment let it be attended to. Tea is a substantial foreign exchange earner and the tussle between them regarding its status will only push tea growing to slow death.

— **FINANCIAL EXPRESS**

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GINGER - A SPICE CROP GROWN ACROSS THE COUNTRY

Ginger (*Zingiber officianale* Rosc) is an important spice crop of the world. It is a herbaceous perennial belonging to the family Zingiberaceae. One of the oldest known spices, ginger, has been used by man since several centuries not only as a spice but as medicine also. Its place of origin has not been established with confirmity but Indo-China region is supposed to be the home of this unique spice. Ginger in its fresh (green) as well as dried forms find innumerable uses in culinary and medicinal preparations. In the Indian system of medicine (Ayurveda) ginger is a time renowned cure for digestive disorders. India is the largest producer and exporter of this spice. Other important producers are China, Jamaica, Nigeria, Sierra Leone, Thailand and Australia.

In India, ginger is grown in an area of 55500 ha with a production of 1,56,180 tonnes of dry ginger as per 1991-92 figures. It is cultivated in almost all the states in India. Kerala alone accounts for about 40 per cent of the total dry ginger production. Meghalaya, West Bengal, Orissa, Karnataka, Himachal Pradesh, Mozoram, Tamil Nadu, Andhra Pradesh, Madhya Pradesh and Gujarat are the other important ginger growing states. Major portion of the ginger produced in India is consumed domestically in the raw (green) form as a vegetable. Only dried ginger is exported. Pakistan, Bangladesh, USA, Morocco and Saudi Arabia are the major importers of our ginger. The popular uses of ginger are as flavourant in food products, pharmaceutical preparations, soft drinks, alcoholic and non-alcoholic beverages, confectionery, pickles etc.

In the year 1993-94, India exported 17150 MT of ginger contributing 95 per cent of the total world trade. Our annual earning due to ginger export is around Rs. 20 crores. China our major competitor in the world market and offers ginger at cheaper prices threatening India's position. It is, therefore, imperative that we must improve the productivity of our crop to make our prices more competitive. Indian ginger has, of course, the advantage of superior intrinsic quality over that of the Chinese produce. However, the Jamaican ginger is the most sought after produce in the global market due to its less fibre nature and creamy white colour on processing. Thailand is a new entrant in the market.

Botany :

Ginger is a herbiceous perennial with underground rhizomes having serial leafy shoots (pseudostems) of 0.5 to 0.75 m height. Leaves are sheathy, alternatively arranged, linear with 15 cm long. Flowers are sessile and borne on a condensed, oblong and cylindrical spike with numerous scar bracts. The flowers are yellow in colour with dark purplish spots. They are bisexual, epigynous, three carpelled and possess only one stamen. There is no seed set in ginger probably due to low pollen fertility.

Climate and soil :

Ginger grows best in warm and humid climate. It is mainly cultivated in the tropics from sea level to an altitude of 1500 m, both under rainfed and irrigated conditions. For successful cultivation of the crop, a moderate rainfall at the sowing time till the rhizomes sprout, fairly heavy and well distributed showers during the growing period, a dry weather with a temperature of 28 to 30°C for about a month before harvesting are necessary. Prevalence of high humidity throughout the crop period is desirable. Ginger thrives best in well drained soils like sandy or clay loam, red loam or lateritic loam. However, being an exhaustive crop, soil should be rich in organic matter. It may not be desirable to grow ginger in the same site year after year.

Varieties :

Taking recourse to high yielding varieties is one of the various ways to increase yield of a crop. Crop improvement programmes in ginger are hampered by lack of seed set leading to limited variability. Somaclonal variation could be an important source of variability that could be exploited to evolve high yielding and high quality lines.

Several cultivars of ginger are grown in the different ginger growing areas in India. They are generally named after the localities or places where they are grown. Some of the more prominent indigenous types are Maran (Assam), Kuruppampadi, Ernad and Wynaad local (all from Kerala). A high yielding introduction, Rio-de-Jeneiro has become very popular among the growers. Its yield potential is 25 to 30 tonnes per

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hectare. The fibre content is 5.19 per cent and dry ginger recovery is 16-18 per cent. Recently, the High Altitude Research Station, Pottangi (Orissa) has released three improved varieties :

Season :

The best time for planting ginger in west coast of India is during the first fortnight of May with the receipt of pre-monsoon showers, while in North Eastern states, it is during April. Under irrigated conditions, it can be planted well in advance during the middle of February or early March.

Preparation of land :

Preparation of land starts with the receipt of early summer showers. The land is to be ploughed 4 to 5 times or dug thoroughly to bring the soil to fine tilth. Weeds, stubbles, roots etc. are removed. Beds of about one metre width, 15 cm height and of any convenient length are prepared at an interspace of 40-50 cm in between beds. In the case of irrigated crops, ridges are formed 40 cm apart.

Ginger is always propagated by portions of the rhizomes, known as seed rhizomes or setts. Carefully preserved seed rhizomes are cut into small pieces of 2.5 - 5 cm length weighing 20-25 g. each having one or two good buds. The seed rate varies from 1500 to 1800 kg per hectare from region to region. The seed rhizomes are treated with 0.3 per cent. Dithane m 45 for 30 minutes, drained and planted at a spacing of 15-20 cm along the rows and 20 - 25 cm between the rows. The seed rhizome bits are put in shallow planting pits prepared with a hand hoe and covered with well rotten farmyard manure and a thin layer of soil and levelled.

Mulching :

Mulching the beds with green leaves is an important operation for ginger. Besides as a source of organic manure, mulching prevents washing of soil, conserves soil moisture, smothers weed growth and improves the physical properties of the soil. The first mulching is done at the time of planting with 12.5 tonnes of green leaves and the subsequent mulching is given after 40th day and 90th day with five tonnes of green leaves per hectare immediately after weeding and application of fertilisers. Application of neem cake at two tonnes per hectare helps in reducing the incidence of rhizome rot of ginger to an extend and increases the yield. Daincha can be raised in the interspaces of beds immediately after planting ginger and they can be uprooted and used for second mulching after earthing up. Application of NPK at a rate of 75 : 50 : 50 kg/ha in three split dozes is recommended for better yields.

After cultivation :

Weeding is done just before fertiliser application and mulching. Two or three weedings are required depending on the intensity of weed growth. Proper drainage channels are to be provided when there is stagnation of water.

Rotation and mixed cropping :

Being an exhaustive crop, it is not desirable to grow ginger in the same land continuously for years and is hence commonly rotated with other crops. The crops most commonly rotated with ginger are tapioca, chillies, paddy and gingelly in rainfed areas and ragi, groundnut, maize and vegetables in irrigated conditions. In some areas ginger is also cultivated mixed with ragi red gram and castor. Ginger is also grown as an intercrop in coconut, arecanut, coffee, orange, mango and guava plantations.

Harvesting and curing :

The crop is ready for harvest in about eight months time when the leaves turn yellow, and start gradually drying up. Harvesting is done from 6th month onwards for marketing the produce as green giner. The rhizomes are thoroughly washed in water two or three times to remove the soil and dirt and sundried for a day.

For preparing the dry ginger, the crop is harvested between 245 to 260 days. When the leaves turn yellow and start gradually drying up, the clumps are lifted carefully with a spade or digging fork and adhering soils removed. The average yield per hectare varies from 15 to 25 tonnes.

The ginger rhizomes are then kept soaked overnight in water. The rhizomes are rubbed well to clean them. After thoroughly cleaning it is taken out from water. The outer skin is removed with split bamboo having pointed end. Only the outer skin is to be peeled as otherwise the essential oil which remains beneath the skin will be lost. The peeled produce is washed and uniformly sundried for a week. In order to get rid of the last bit of the skin or any foreign matter the dried

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Varied issues

Leaving apart the Act in question, it incorporates Tea Rules 1954, Tea Board By-Laws 1955, Tea (Distribution and Export) Control Order 1957, laws affecting Tea Packaging under Trade and Merchandise Marks Act 1958, Standards of Weights & Measures (Packaged Commodity) Rules 1977, Tea (Marketing) Control Order 1984, Tea (Warehouse Licensing) Order 1989 and lots of other important rules and orders.

Truly indispensable

The work appears to be an excellent source of guidance especially to lawyers, brokers, bankers, municipalities, academics as well as tea estate and plantation management in this potentially complex area of the law and offers an authoritative coverage of legal aid, advice and assistance.

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rhizomes are rubbed together : These are called unbleached ginger. To get good appearance, peeled rhizomes are soaked in 2 per cent quicklime water for six hours and then dried and this is known as bleached ginger. The yield of dry ginger is 16-25 per cent of the fresh ginger depending on the variety, location etc. Bleached ginger having uniform white colour and less fibre content gets two to three times higher price than ordinary ginger in the international market.

Seed rhizomes :

In order to get good gemination, seed rhizomes are to be stored properly in pits under shade. Large and healthy rhizomes from disease free plants are selected immediately after harvest for seed. The rhizomes harvested during December - January have to be preserved for about four months before planting in April-May. These rhizomes are treated with a solution containing 0.1 per cent quinalphos and 0.3 per cent dithane m45 for 30 munites and then placed under shade till the solution on the surface is dried. This is a prophylactic measure against soft rot disease and scale insects. The seed rhizomes are stored in pits of convenient size in sheds.

The walls of the pits may be coated with cowdung paste. The seed rhizomes are put in pits and covered with a wooden plank having one or two holes. Sufficient gap is to be left at the top of the pits for adequate aeration. The seed rhizomes can also be stored in pits dug in the ground under shade. In some areas, the rhizomes are loosely heaped over a layer of sand or paddy husk and covered with dry leaves in a thatched shed.

PESTS

1. Shoot borer :

The pest (*Conogethes punctiferalis*) generally damages the pseudostem and sometimes rhizomes also. The pest incidence can be detected by the presence of holes on the pseudostem, frass thrown out of the holes and the yellowish withered central shoots (dead hearts). The affected central shoot comes out when pulled. The pest can be controlled by spraying 0.1 per cent Malathion from July to October at monthly intervals.

2. Leaf roller :

The caterpillar folds the leaf and feeds from within. The pest can be controlled by spraying 0.1 per cent carbaryl or 0.05 per cent dimethoate.

3. Rhizome scales :

The pest (*Aspidiella hartii*) causes damage to ginger rhizomes under field as well as under storage conditions. They suck sap from the rhizomes as a result of which the rhizomes shrivel and dry up. The pest can be controlled by dipping the seed rhizomes in 0.05 per cent Malathion or dimethoate at the time of planting/sorting seed rhizomes.

DISEASES

1. Soft rot or rhizome rot

It is the most destructive disease which results in total loss of the affected clumps and is caused by *Pythium aphanidermatum.* Disease symptoms appear as light yellowing of the tips of lower leaves which gradually spreads downwards to the leaf blades. In the early stages the middle portion of the leaf remains green while the margin becomes yellow. Yellowing spreads to all leaves of the plants from bottom upwards and is followed by drooping, withering and drying. The collar region of affected pseudostem becomes water soaked and rotting, spreads to the rhizome resulting in typical soft rot of the rhizomes. Lack of drainage and continuous dampness of the field predispose the plant to disease. The disease spreads through seed rhizomes and soil. Control measures include provision of adequate drainage in the field, selection of disease free seed rhizomes, treating the seed rhizomes with 0.03 per cent Dithane m45 for 30 minutes before storage and before planting and drenching the beds with the same fungicide or captafor 0.1 per cent. Once the disease is located in the field, careful removal of the affected clumps and drenching the affected and surrounding beds with the above mentioned fungicides would check the disease spread.

2. Bacterial wilt

The disease is caused by *Pseudomonas solana - cearum.* The first conspicuous symptom is mild drooping and curling of leaf margin of the lower leaves which spread upwards. In the advanced stage the plants exhibit severe yellow and wilt symptoms. The disease can be prevented by treating the seed rhizomes with 200 pp. of any of the antibiotics like streptocycline/ plantomycin/agrimycin. In advanced stage the diseased clumps should be immediately removed and destroyed and the area should be drenched with 200 ppm of antibiotics of 1 per cent Bordeaux mixture.

3. Leaf spot :

The disease caused by *Phyllosticta zingiberi* appears as small oval to elongated spots on leaves. The spots are white and papery and the centre surrounded by a dark brown margin. The disease incidence is severe when ginger is grown under exposed conditions. This can be controlled by spraying 1 per cent Bordeaux mixture or 0.2 per cent Dithane m45.

The major production constraints in ginger are the crop loss due to rhizome rot and bacterial wilt. None of the existing cultivars are tolerant to these devastating diseases and breeding for resistance is ruled out since seed set has not been reported in ginger. The only alternative seems to be, the selection of mutants (somatic mutants) from the plantlets raised by cell or callus culture.

- SPICE INDIA

Name of vareity	Percentage	Yield potential (t/ha)	Crop duration in days	Special characters
Suprabha	Clonal selection from Kunduli local	3.40	229	Profuse tillering, plumpy fingers with oval tips, bright grey stem fibre 4.4%, oil 1.9%, oleoresin 8.9% both in green and dry ginger excellent for hilly areas
Suruchi	Clonal selection from Kunduli local	2.72	218	Less susceptible to diseases, rihizomes, greenish yellow, fibre 3.8%, oil 2%, oleoresin 10%
Suravi	X-ray mutant of local cultivar	4	225	Fingers cylindrical, rhizomes dark glazy skin, profuse tillering

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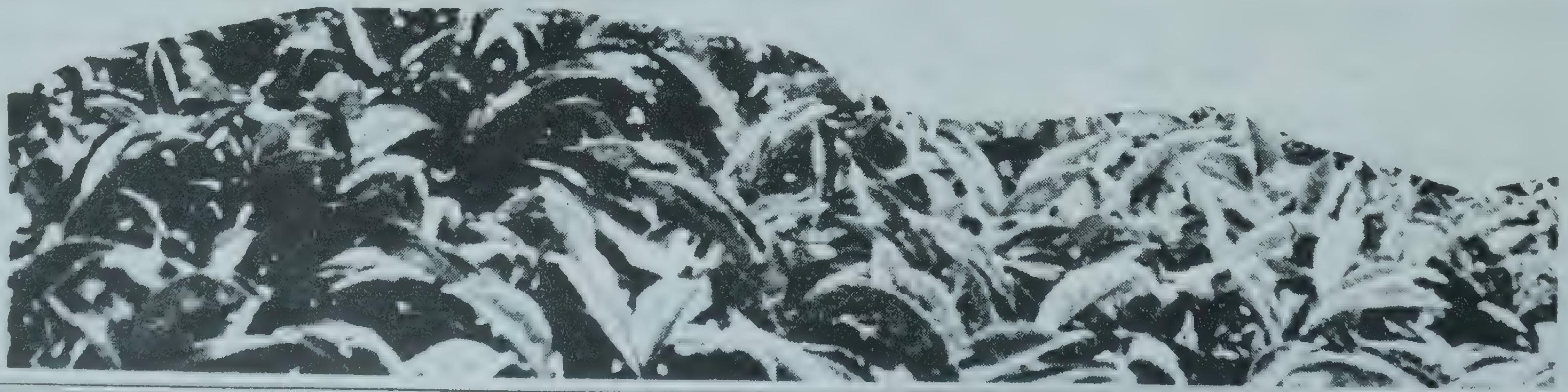

CONSOLIDATED COFFEE LIMITED

Regd. Office : **POLLIBETTA - 571 215, KODAGU, KARNATAKA, INDIA.**

Text of the speech delivered by Mr. R.K. Krishna Kumar, Chairman, at the 52nd Annual General Meeting of the Company held in Pollibetta on Monday, the 26th June, 1995.

YEAR UNDER REVIEW

During the year under review, Consolidated Coffee Limited, your Company, moved further forward, on several fronts, primarily, propelled by record profits and in faithful pursuit of excellence.

2. The Audited Accounts, which are in your hands, presents a detailed picture and I will be happy to answer any questions that you may wish to ask after I propose the motion for the adoption of the Accounts and the Directors' Report for 1994-95. Before I do so I shall dwell on major developments and some overall policy issues that have had an impact on the Coffee Industry during the year under review and, indeed, on your Company.

COFFEE MARKET SCENARIO

3. The momentum of unshackling India's Industry, including the Coffee Industry, which has gathered force in the last three years, continued during the year under review. Even before the winds of liberalisation moved across the Indian landscape early in the 1990's, your Company, as a member of the United Planters' Association of Southern India, had taken a strong lead in arguing before the Government and in pursuading all segments of the industry on the merits of free marketing of Coffee. I am happy that this move has now broad-based itself and, progressively, the Coffee Industry is being freed from meaningless regulatory restrictions. I express the hope that the remnants of the regulations, even now in force, will be done away with in the near future, setting out, for the Indian Coffee Industry, a new and exciting destiny.

4. In the fiercely competitive environment that lies ahead, a major determinant of corporate success will be complete commitment to quality. We will do well to ensure that quality consciousness permeates deep within our large Organisation.

5. Domestic prices of Coffee remained fairly steady during the early part of 1994-95. However, adverse agro-climatic conditions, in major coffee producing nations in South America, fueled a relentless escalation in the world prices of coffee. The domestic prices, in India, move in sympathy in a world that is increasingly inter-linked in a manner never before witnessed.

6. At the end of June and early in July 1994 a severe frost hit Brazil, inflicting unprecedented damage on Coffee production in that country. This widespread damage triggered the current explosion in coffee prices.

7. Your Company's operations benefited from the sharp upward trend of prices. Coffee prices have gone up higher than ever before as an inevitable consequence of free market forces that operate in the global economy today. As production in South America catches up, Coffee prices should come down, even in India. There is, therefore, no need for serious concern at the current ruling levels of Coffee prices which have, indeed, shown a marginal declining trend in recent weeks.

PURE COFFEE

8. Your Company's strategic plan was not merely to harvest the windfall profits of this situation but to utilise the current era of prosperity to greatly strengthen, both its fundamental production-base and, importantly, its marketing posture. Your Company has successfully launched value-added products directly for use by the consumer with the 'Coorg' brand of Coffee which has met with overwhelming response from a large customer-base in the States of Tamil Nadu and Karnataka. Through a series of Marketing measures, beginning with product research and sustained inputs on brand equity building, your Company has successfully established 'Coorg' as a major brand in the pure coffee market. It did not, however, ignore its social responsibilities and 'Coorg' has been consistently marketed at prices well below the prevailing market prices of other brands of comparable quality. Major marketing investments have been made, not only, in the South but also in the North where coffee bags were introduced, for the first time, in the country, which has also met with enthusiastic consumer response. It is to be noted that your Company is facing intense competition, not only from a large number of regional players but also from powerful multinational companies with substantial resources. More importantly, most of the competing companies mix chicory with coffee at such high levels that the products that some of them market can hardly be called coffee! Your Company has, consistently, offered to its consumers, a pure coffee, unadulterated in the truest sense of the word, at prices which are affordable. This is the reason why its brands have met with instant success in the market place.

HARNESSING PROSPERITY

9. It is your Company's intention to continue on this path and to add value to its produce, across a broad range. While investing in its marketing activities, your Company is also, currently, embarking on a major programme of reinforcing its production-base with massive investments going into the fields and processing facilities which will, when completed, enormously strengthen and increase production and improve the quality profile of its products. While the focus is on increasing coffee production with special reference to value added segments, equal attention is being paid to other areas such as production of pepper, nurturing of its vast timber resources and, indeed, injecting the possibility of value-added sales of these other products as part of its overall strategy. We expect these measures to yield handsome dividends in the coming years, not only, to the shareholders and the employees, but also to the community and the nation at large. Shareholders can, I firmly believe, take pride in the fact that your Company is vision driven.

SERVICE TO THE COMMUNITY

10. Your Company has forged ahead in actively supporting the establishment of the Coorg Foundation, whose mission it is, to regenerate the inherent strengths and agro-diversity of this beautiful region where the majority of your Company's coffee estates are located. Along with the foundation, your Company is actively engaged in promoting the welfare of the Malnad region. It is a fundamental tenet of the Tata philosophy that no industrial enterprise can thrive and flourish without involving itself with the welfare of the community in which it operates and participating strongly towards the growth and development of that community. The Coorg Foundation will, hopefully, lead the way for all those interested in protecting and nurturing the inherent strengths and beauty of Coorg and its rich natural assets.

INDUSTRIAL RELATIONS

11. The serenity of the Malnad atmosphere is matched equally by the prevailing peace in the Coffee plantations. You will be happy to know that Industrial Relations in your Company's units continue to run satisfactorily. It is one of the goals of the Company's policies to utilise current prosperity to upgrade the quality of life of its workers and their living conditions. Your Company has introduced a system of Welfare Audit on all its estates and it strongly committed towards further upgrading the several facilities that are made available to its workers and their families.

DIRECTORATE

12. Mr. D.S. Seth relinquished his office as Chairman of your Company on 31st March, 1995 and I have been given the difficult task, and the privilege, of succeeding him as Chairman. Mr. Seth is the author of the transformation of Consolidated Coffee Limited into what it is today – a dynamic and highly profitable member of the Tata Group. It was Mr. Seth's vision and leadership that led this Company through its initial years. In agreeing to succeed Mr. Seth, I was emboldened by the fact that I will continue to receive his guidance and wise counsel as Chairman Emeritus.

13. Consolidated Coffee Limited is poised for an exciting period of further transformation which will pose many challenges as it prepares to compete and participate in the unfolding global economy of the 21st century. One of the great strengths of this Company is the team of management, staff and workers operating under the able leadership of the Managing Director, Mr. M.A. Bopanna, and I am sure that all the shareholders and the Members of the Board would like to pay tribute to this team and wish its endeavours every success in the years ahead.

(This does not purport to be a record of the proceedings of the Annual General Meeting).

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IT'S CHIC TO DRINK COFFEE

By MOHINDER SINGH

Park Hotel, Delhi holds a month-long coffee festival. Various coffees and their preparations are served therein. Tatas introduce their coffee bags — chicory free — with much fanfare. And stylish coffee corners are coming up in several places.

Indeed, all over the world, especially in the U.S. which consumes one-third of the world's coffee, a new coffee chic is evident. The lowly coffee bean is being exalted into un-precedented combinations, flavours, and espresso-based concoctions. Pricey coffee bars are replacing cheap coffee counters. And you see in them rows of glittering machinesbusily brewing the stuff; transfiguring the muddy liquid into high-octane fuel of the information age. Even McDonald's is testing espresso machines in many of its fast-food outlets.

Smart offices are one-upping each other in replacing their old-style percolators with sleek espresso and cappuccino makers. (Achile Gaggia of Italy perfected his espresso machine in 1946. And Cappuccino is named for the resemblance of its colour to the robes of the monks of the Capuchin order), and taking to expensive designer blends in place of the standard Nescafe and Maxwell House. That is in line with company policy these days to woo superior personnel with an attractive working environment.

And coffee is considered conducive to productivity; people drinking more and stronger coffee putting in bursts of caffeine energy into their work. The urban workday economy would be unthinkable without coffee.

Coffee, that way, has never been just a drink. It has always been loaded with social and political connotations as well. Coffee houses and cafes were the centres of intellectual life and political discussions, where the price of one cup also brought unhurried time at a table.

And now fancy coffee bars are in for a novel role; coffee there becoming the elixir of seduction. In New York, several "singles" coffee bars have sprung up. These are being used more for sexual pickups than intellectual stimulation.

A coffee bar has this advantage over other pickup joints; drinking coffee is the least toxic indulgence. Much less threatening to the health-obsessed, besieged by bad news about everything from cigarettes to drugs.

The new coffee chic has been boosted by another development; the mass marketing of high-quality coffees. A top-end coffee bar is apt to offer a large choice of exotic coffees and in different preparations. Manufacturing companies are also inculcating a sense of connoisseurship in their patrons. Coffee is being touted as a symbol of developed taste, making people take pride in the refinement of their palate, the way wine makers do. You are one up if you know the difference between Guatemalan Highland and Jamaican Blue Mountain.

Firms making soft drinks, ice creams, yoghurt, sweets have also jumped in, offering more and more concoctions laced with coffee.

Environment-sensitive coffee drinkers have started asking for ecobrew. After cotton and tobacco, coffee plants are the most heavily sprayed with pesticides. Fortunately, the beans are protectively isolated inside the cherrylike fruit, and the 400-degree roasting process effectively breaks down the toxic chemicals. But these sprays pose a threat to growers, more so to pickers, besides being an overall hazard to the ecosystem.

Consequently a demand is cropping up for organic coffee, certified as such. The beans must come from plantations where no pesticides are used. As coffee is naturally susceptible to insects and disease, farms are required to use natural predators and disease-resistant mulch-though. In the end, many farms do resort to chemical spraying.

Farmers must use ground cover and plant fruit trees for shade and as secondary crop. The diversity of its bird life suffers when a coffee plantation is converted from shade to sun for obtaining higher crop production. And only compost is to be used as fertiliser.

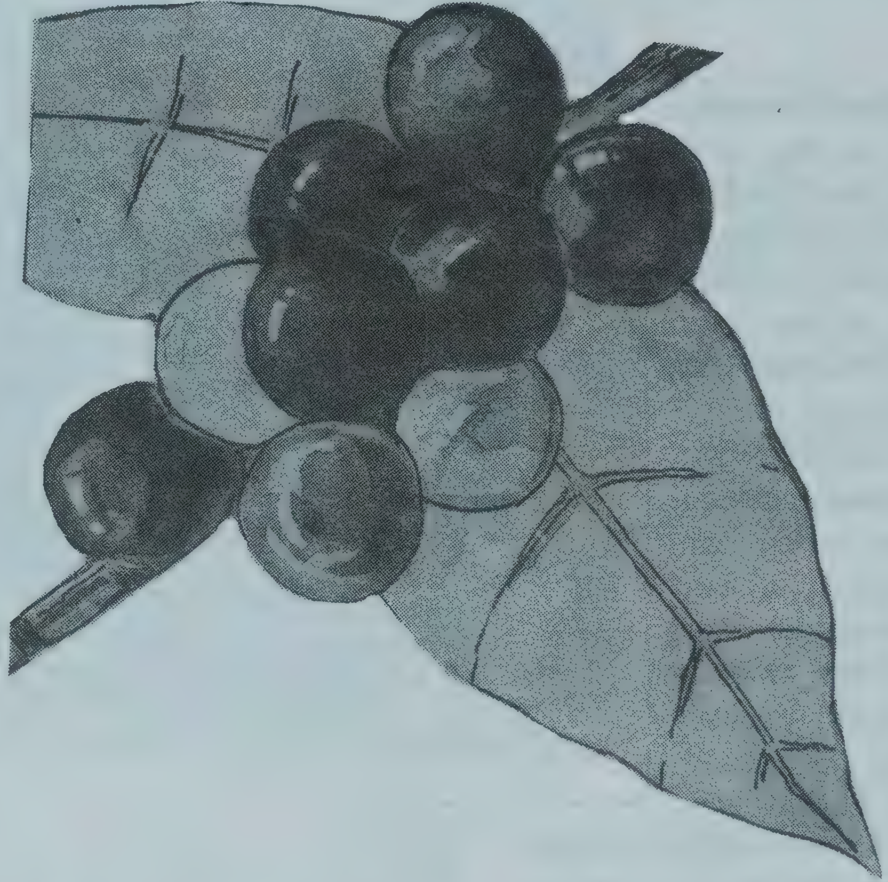
Scientists are otherwise engaged in genetically altering coffee plants which would increase their pest resistance, even impart improved flavour and aroma to the beans.

Organic coffee is pricier – sometimes up to dollar more per pound – and not particularly superior in taste. Yet there are people who are willing to pay for it in the interest of environment.

The coffee chic means not only acquiring a taste for coffee, but also coming to love the ritual, like the Japanese tea ceremony. You develop a style of taking coffee – straight black, with sugar or without, with cream or milk, scalding hot or warm – to the way you blow on it and wrap your hands around the cup, to the way you lift it to your mouth, the way you sip or gulp. To that extent, coffee drinking is becoming a small but vital way of displaying one's sauvity.

— THE HINDU

INTERNATIONAL COFFEE CONVENTION



An International Coffee Convention is being organised to be held in Bangalore tentatively on 11th and 12th January 1996 jointly by the United Planters' Association of Southern India (UPASI) and the Coffee Board. In addition to coffee growers and buyers from abroad, leading traders/roasters from USA, Europe and Far Eastern countries are also expected to participate and share their knowledge and experiences in the Coffee World.

Further details regarding the delegates' registration procedures etc. will appear in the ensuing issues.

GROWING PROFESSIONALISM IN MANAGEMENT

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Interview with

Dr. C.K. PRAHALAD

Dr. Prahalad, you have been visiting India for the last three years and talking to business leaders and senior managers. What changes in management attitudes do you see among companies?

There are three or four kinds of changes that are taking place. One is from a sense of fear, anxiety and helplessness about competing with the MNCs to one of confidence and hope. While MNCs will change the internal competitive dynamics in India, it is not a foregone conclusion that you cannot compete at all. There is a realisation that it is a different game, and the game will have to be played with different rules. But it is possible for Indian companies to outcompete and grow. There has been some evidence that it is possible. For instance, Bajaj and Arvind Mills.

Second, globalisation was seen as opening up India to MNCs, but companies realise that there is a flip side to it — the opening of world markets to Indian companies. This is a bigger change than is realised. Third, people are looking at opportunities for growth and increase in size in totally different ways than they did before. Earlier, the thinking used to be : If India grows at three per cent and we also grow at the same rate, then we are in good shape. But now, they say that if India grows at three per cent then we can grow at 25 per cent and so the mental shackles about confining their opportunity space to just the vagaries of the Indian market has shifted.

The fourth is, for the first time I hear people talking about the importance of human resources. I think the compensation changes might have helped. But because of the growth and competition, companies need a different quality of people who can help compete with MNCs. I think for the first time the chances for professionalism in Indian management is on the horizon.

The last think is that I detect a fair amount of opportunism (and I use it in the positive sense) in the way companies are diversifying. That is going to lead to some pleasant and some unpleasant surprises. In other words, the availability of collaborations today is almost analogous to the availability of licences in the last ten years. And the attitudes and behaviours about which businesses to get into are exactly the same. On the availability of licences, companies had little control, but on availability of collaborations you have a lot of control. You don't have to get into collaborations with everybody; you can choose who you want to collaborate with.

Overall, there is a fair amount of optimism, some humility and more respect for professionalism. That does not mean we have become professional. We respect professionalism which to me is not just non-family businesses are not professional and family members could be professional. It is how transparent you keep the decision process and how performance-oriented you are that makes the difference.

You are talking about opportunism in the way companies are diversifying. Earlier, you have said that companies should diversify into new areas based on their core competencies. In the Indian

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— **Reproduction of the excerpts from the Interview with Dr. C.K. Prahalad, Harvey Fruehauf Professor of Corporate Strategy at the University of Michigan, US, which appeared in the Business Line.**

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context, what kind of competencies do Indian companies possess that can be leveraged for diversification?

The telecom and power which have been made available to the Indian private sector for the first time. Now, what Indian companies bring to joint ventures in these sectors is a skill base. It has nothing to do with technology, not even financial strength but more about detailed knowledge about the country, the political processes, the institutions, on how to get things done in India. My starting point is not that the private sector should not get into collaborative arrangements but then if you also want to be in cellular phones and power and cables, the chances of your digesting and understanding the requirements of these, the technical marketing requirements, the global dynamics of these industries, the opportunities for making improvements and innovations in these areas are onerous. One is not saying don't diversify into these sectors. One is saying, pick those sectors that you want to play for the long haul and then make several joint ventures in those or several projects in that area, so that you get some scale.

At the CEOs Forum Press Conference you said that Indian companies should make the workplace more fun to retain people. What do you mean by this ?

Somebody asked me the other day about problems in Indian companies and why people were getting frustrated at work. I see it this way: if there are 1,000 people we give them a 1,000 piece puzzle and ask them to put it together without giving them the picture. If you have ever tried putting together a puzzle without a picture you know how hard it is. This is what is happening in Indian Companies.

It is not sharing the competitive agenda that makes working not so much fun. Second, we are not stretching the imagination of the people around. We are not asking ourselves. "Why can't we be the world's number one?" Not tomorrow, not in the next two years, say in the next 15 years. Why don't we have the perspective to be the number one. The third is that we don't expect people to have high personal and professional standards. I think if you expect high personal and professional standards, people have to spend a lot more time worrying about what is the level of training they are getting, what is their skill base, how to benchmark their skill base against their counterparts elsewhere in the world.

I think the expectations are too low. Not in terms of hours of work but in terms of quality of work. You have to motivate people by establishing high standards but in a sensible fashion. You can't set high standards without infrastructure or training and opportunities.

The fourth point is to celebrate small wins. We tend to be critical almost to a point of being obsessive. We don't want to see success stories. The other day I was in Infosys and it is a success story by any standard. That is not celebrated as much as failures are written about. Yes failures have to be written about. I understand that. But there are young people with an average of 24 to 25 people who are taking on world class work.

But small enterprises do not want to share success stories

Yes, small companies, single perso-run companies, tend to be secretive. But I would like to talk about a different kind of sharing of success. That is what I challenged people in a company like Infosys to do...

We must create many, many millionaires. Millionaires not based on birth and privileged positions but based on performance and contribution to work, and that is what the system at Infosys is doing. And I think we need to talk more about it. That should become the performance work culture. A culture where one bunch of people slog and get only salaries and the other group takes all the residual value- that cannot work. Especially, not in high technology industries. Things like employee stock options should become part of our work culture. We have to learn to say that as long as affluence is a result of the contribution, we should promote and celebrate it rather than decry it.

Aren't stock options seen more as a way of retaining people.....?

Why not? That is exactly the way it is. The reason why you should retain people is because they are great contributors. That is precisely the reason why you should offer such an option. Why do owners stay with companies? Because they own stock. So why should't I make you an owner and make you stay in the company, because you are making a good contribution. Instead of being a negative, that is the reason for doing it.

But if there were enough skilled people then would companies still offer such an option?

That is not right. There could be enough skilled people, but you want to retain those who contribute to your company. The assumption you are making here is that people are totally substitutable. They are not. When you are building a team you don't want a continuous stream of substitutions. You want the group to go forward and that is a good reason to make this offer.

In an interview last year, you had said the public sector companies in India had a lot of potential that could be leveraged. What kind of potential do you see?

On the positive side, public sector companies are in growth sectors like power, telecom and the roads sector. Take BHEL for instance. Second the asset structure of this sector is good, considerable investments have gone into creating this structure. The skill base available in the public sector is also good. On the negative side, it is highly bureaucrated and politicised.

Over the Years massive Investments have gone into building assets in this sector. You have to recognise that to get the benefit of these large investments you have to do radically different things to ensure that these assets are well utilised.

How exactly do you do this?

It depends on the situation. If you are in the boiler business and this country is going to put up a lot of new power plants, you have a lot of experience in building boilers and designing boilers. You should become the primary contractor and seek to build all the boilers that this country will need and then follow the example of South East Asia.

But then, in all the new power plants that are being planned, the foreign collaborator is bringing in the equipment from the home country?

But why can't you be the lowest-cost producer. Most of these large power companies certainly understand costs. Producing lower costs is certainly a competitive advantage. Let's say that the structural designing is made abroad but the fabrication can be done here. The technology involved is fairly low-tech. This is exactly what countries such as Mexico, Korea, Thailand, China and other South-East Asian countries have done. Hyundai does in Korea. I know companies in Mexico that do it. The Chinese do it. Why can't we do it here for our power plants. May be, there is something else to it that I don't know. The issue here is simple, no company in the world will insist that it has to ship components half way across the world when it can be easily sourced locally, as long as the local supplier can do it at a lower cost.

At a recent meeting you said that in your work you always like to look at the next frontier. What next after core competence?

The next frontier is about internal governance in global companies and how they manage complexities of doing business across different countries

- GOPAL RATNAM

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MEETINGS

- Working Group on International Coffee Convention and Coffee Committee in Bangalore on 19th June.
- Joint meeting of Tea Technical Committee and Tea committee in Cochin on 21st June.
- Joint meeting of Rubber Technical Committee and Rubber Committee in Kottayam on 28th June.

DELHI REPRESENTATIONS

Mr. A Ramesh Rao, UPASI President, called on Shri P. Chidambaram, Hon'ble Union Minister of State for Commerce, at Delhi on the 6th June. He extended invitation to the Minister to be the Chief Guest and inaugurate the 102nd Annual Conference of UPASI in Coonoor in September 1995. On commodity issues, the President mentioned to the Minister that the Pool Fund should not be used for purchase of coffee in the open market by the Coffee Board and direct sale to the consumer as a measure of price stabilisation, since this will adversely affect the return to those growers who pool their coffee. While on the subject, the Minister impressed upon the President to issue an appeal to the large growers to pool 30 per cent of the crop as required. The falling trend in coffee prices was brought to the notice of Mr. Chidambaram. Mr. Ramesh Rao sought early action by the Ministry on the proposal of securing World Bank assistance to the tea industry. The adverse effect of unbriddled imports of natural rubber was also highlighted. Another issue taken up was the need for bringing down the rate of taxation of agricultural income by the State Governments.

TEA ACT/CONTROL ORDERS

A meeting on the pending issues on amendments to Tea Act was held at Tea Board, Calcutta on 6th June, chaired by the Board Chairman. The discussions were very brief and inconclusive. On reducing the number of members of Tea Board, the Chairman said that instead of making cosmetic changes, it would be useful to hold more frequent meetings of Board's Development and Export Promotion Committees to which representatives of industry and trade could be invited. He agreed to the suggestion that some of these meetings be held in South India. In the case of cess collection, the Chairman was informed that the Excise Authorities have prescribed a simplified procedure and South Indian tea interests were not facing any problems. On Tea (Marketing) Control Order, the Chairman said that not only the provision relating to compulsory auction, but the entire Order needed a review from the view points of producers, traders and auctioneers.

SHIPMENT LICENCES

The Government of India has dispensed with the requirement of obtaining shipment licence from Tea Board for every consign-

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ment exported. With a view to compiling data on exports, the Board has requested the exporters to submit monthly returns.

PESTICIDE RESIDUE

A booklet "How to reduce pesticide residues in tea?" has been brought out by the UPASI Tea Research Institute. This has already been circulated to tea interests. The booklet contains the maximum residue limits prescribed by major import markets, efforts made by Government of India and Indian tea industry to reduce the residue levels, guidelines to keep the pesticides below the maximum limits, suggestions for the safe and effective use of pesticides, pest management programme, etc.

CORE COMMITTEE ON COFFEE

A meeting of the Core Committee on Coffee was held in Delhi on 21st June, which was chaired by Mr. Tejendra Khanna, the Commerce Secretary. The meeting reviewed the production, export and price scenario of coffee. The berry borer problem in India engaged the serious attention of the committee and was perceived as an emerging threat to sustain the production increase. The industry's proposals on amendments to Coffee Act will be coming up at the next meeting.

SEMINAR ON PRIMATES AND ITS BEHAVIOUR

A seminar on "primates and its Behaviour " was organised in Coonoor by UPASI-KVK on 12th June. Dr. P.B. Seshagiri, Scientist from the Indian Institute of Sciences, Bangalore, in his address, said that the exploitation of hill areas in the Nilgiris, have resulted in massive deforestation and urbanization resulting in the loss of habitat for several animal species, especially the primates. He said major conservation measures must be taken involving the Nilgiris Rural/Tribal Community to preserve one of the last remaining bio-reserves of the country which abounds in a variety of rare plants and animal species most of which are endangered.

RENEWABLE ENERGY TECHNOLOGY

A symposium on renewable sources of energy (RSE) was organised in Coonoor by UPASI-KVK, on 18th June, with the support of Indian Renewable Energy Development Agency (IREDA) and Planters Energy Network (PEN) of the Madurai Kamaraj University. The UK expert and advisor to IREDA, Dr. T.J. Hart, highlighted the various renewable energy projects like Solar Thermal, Solar Photovoltics, Wind Power and Small Hydro Power. The World Bank has already mobilised a line of credit amounting to US $ 195 million under IREDA.

WAGE RATES

Consequent to the adjustment of CPI-linked D.A., the wage rates effective from 1st July 1995 are as follows :

	Adult Wage Rate per day (basic + D.A.) ..... Rs.			
	Tea	**Coffee**	**Rubber**	**Cardamom**
Kerala	41.00	41.00	45.00	40.60
Tamil Nadu	40.31	40.31	41.64 + 4.00 *	40.31
Karnataka**	33.98	33.98	34.98	33.98

* Ad hoc advance over the wage as on 31.7.1993

** Effective from 1.4.1995

PRICE TREND (Rs./Kg.)

CROPS	LATEST		6 MONTHS AGO		YEAR AGO	
TEA	C.T.C.	ORTH.	C.T.C.	ORTH.	C.T.C.	ORTH.
COCHIN	37.65	41.49	35.39	38.44	29.64	26.98
COIMBATORE	37.92	42.77	34.67	37.75	25.02	25.75
COONOOR	37.79	34.24	32.95	32.84	22.76	25.98
AVERAGE	37.74	40.21	34.35	37.58	26.04	26.48
COFFEE						
Private Auction						
PLANTATION A	99.53		101.97		88.74	
ARA. CHY. AB	89.73		84.00		80.06	
ROB. CHY. AB	86.56		81.57		64.95	
RUBBER						
a) **Kottayam**						
RSS LOT	55.00		38.00		26.55	
RSS IV	59.00		41.00		28.25	
b) **Kuala Lumpur**						
RSS I	59.02		43.39		30.49	
SPICES						
CARDAMOM	223.00		256.38		243.38	
PEPPER	80.50		68.75		50.00	
CLOVES	90.00		90.00		72.00	
NUTMEG	55.00		90.00		67.00	

TEA CROP - SOUTH INDIA

MAY **TONNES**
1995 : 21,748
1994 : 25,034
1993 : 16,354

JANUARY to MAY
1995 : 70,629
1994 : 84,947
1993 : 65,956

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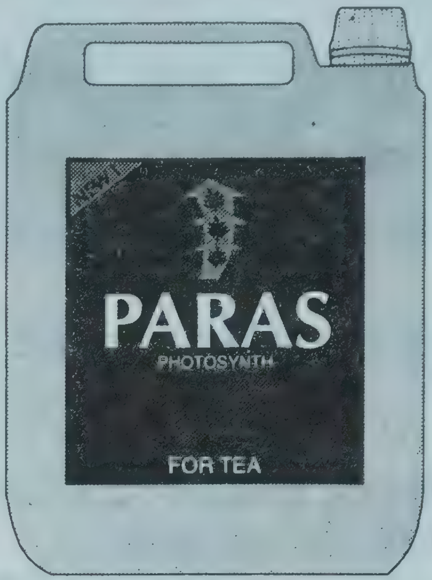

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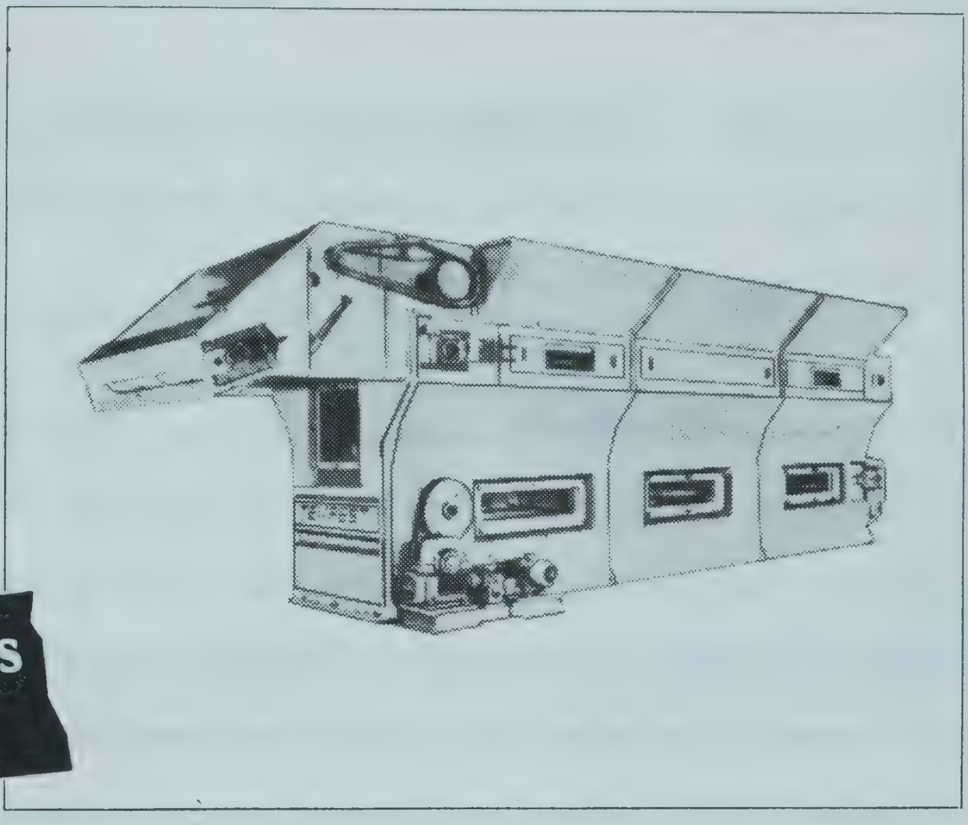

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TEA

Government has been exhorting the industry — and rightly so — to increase production, productivity and export. And more focus on research.

Performance of South Indian plantation industry has been better than All India.

COMPARISON OF TEA PRODUCTION, PRODUCTIVITY AND EXPORT

(M.Kgs.)

3 - YEAR AVERAGE	PRODUCTION SOUTH INDIA			ALL INDIA		
	C.T.C.	ORTH.	ALL TEAS*	C.T.C.	ORTH.	ALL TEAS*
1972-74	35 (34%)	66 (65%)	102	290 (61%)	168 (36%)	472
1992-94	123 (71%)	46 (27%)	173	625 (85%)	102 (14%)	736

(* Including Green Tea)
(Figures in brackets indicate percentage to total production)

3 - YEAR AVERAGE	PRODUCTIVITY SOUTH INDIA	ALL INDIA	EXPORT SOUTH INDIA	ALL INDIA
	.... (Kgs. / Hect.)	....	.... (M.Kgs.)	....
1972-74	1,381	1,312	44 (43%)*	199 (42%)*
1992-94	2,305 (+67%)@	1,763 (+34%)@	46 (27%)@	168 (23%)@

(@ Percentage increase over 1972-74)
(* Percentage to production)

More importing countries in the world prefer orthodox to CTC. Hence to the extent of slower pace of shifting of production from orthodox to CTC, South Indian plantation industry is paving the way for more tea exports.

CTC gives double the cuppage of orthodox. More CTC production means less consumption of tea dust and leaf. And that leads to surplus and downward impact on price. So South has contributed more in arresting the deterioration of health of the tea industry.

COFFEE

Rs 1000 crores *net* export. 'Net' is important. In the case of many items exported, there is import of raw materials resulting in net export not being considerable. Take the case of gem and jewellery. Rs 1000 crores is a decent figure.

Long back learned to operate in world markets without any props from Government. Exporting two thirds of production.

The cup that invigorates. Yes, it is our business. But then it increases the happiness level of those who consume. The 'Gross national welfare' concept. Film producers also claim that by providing entertainment they increase happiness. Why can't the coffee producers make a similar claim. Doctors generally aver that they are doing a laudable service (though they amply collect service charges). Hence what is wrong if coffee growers claim that by providing an invigorating drink, they are also doing service.

RUBBER

15.3 per cent production growth per annum during the last decade. Arresting the outgo of precious foreign exchange; had the production growth been less, then more rubber would have been imported. Quality excellent by world standards.

SPICES

Produces 52 number of spices. Export gone up from Rs. 209 crores to Rs 607 crores during the last 10 years. Hardly any import. Production expected to go up in tune with domestic demand growth and higher volume of export.

RESEARCH

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Other Important Features :

a) Plantations are eco-friendly, reduce soil erosion, besides adding to scenic beauty.

b) With 8-lakh small growers in rubber and 2-lakh small growers in coffee, these plantations provide opportunities for self-employment and entrepreneurship to a large number of persons.

c) Compared to the all India wage level for plantation workers, the wage level of southern plantation workers is much higher. Further, through the tripartite wage agreement, comparative peace has been ensured in the plantation industry.

True, plantation industry (management) can't take full credit for what has been achieved. Yet, nobody would dispute that a large percentage of credit should go to them.

And that justifies the high rating. ✪

EDITOR : D. Ravindran. Printed and published by Dr. D. Padmanaban at Kalaikathir Achchagam, Coimbatore 641 037.
Opinions expressed in this journal are not necessarily those of the UPASI.

HOW TO ENSURE QUALITY INDIAN COFFEE IN A LIBERALISED ENVIRONMENT

By SUNALINI N. MENON*

In the years to come, the instant coffee scene in India would change from the present spray-dried product to a freeze-dried product of even better quality to cater to the changing taste requirements of the consumer.

The infinite care taken by the grower and the Coffee Board, to maintain high standards of quality at each stage of processing, from the seed to the cup, have yielded the desired result — a unique blend of rich tradition and royal quality coffee, Nature, with its favourable climate, the fertile soil, scientific cultivation on hill slopes, selective picking of coffee berries by deft human hands and the careful, painstaking processing of coffee have helped in unfolding the full aromatic flavour latent in every Indian coffee bean.

The land of ancient scriptures and tradition offers you yet another stimulating golden experience — Indian coffee. A stimulating experience of good aroma and flavour, though the recent experience has also been one of escalating prices. However, the delicious, distinctive and distinguishable taste of Indian coffee will enable this drink to transcend from a luxury item to a popular beverage which can be slipped by millions of consumers throughout the world.

A UNIQUE BLEND

The infinite care taken by the grower and the Coffee Board, to maintain high standards of quality at each stage of processing, from the seed to the cup, have yielded the desired result — a unique blend of rich tradition and royal quality coffee. Nature, with its favourable climate, the fertile soil, scientific cultivation on hill slopes, selective picking of coffe berries by deft human hands and the careful, painstaking processing of coffee have helped in unfolding the full aromatic flavour latent in every Indian coffee bean.

In India both the varieties of coffee, namely Arabica and Robusta, are grown. Of the Arabica, approximately 80 per cent is converted into washed coffee- Arabica 'Plantation' — and the remaining 20 per cent is prepared by the natural method and is referred to as Arabica Cherry coffee. Of the Robustas, which account for approximately 49 per cent of coffee grown, approximately 15 per cent is converted into washed coffee which is reffered to as Robusta parchment and the remaining is prepared as Cherry type coffee. The traditional coffee-growing areas are Coorg, Mysore, Bababudan and Billigiri areas of Karnataka State, Wynaad, Travancore, Nelliampathy and Kanan Devan districts of Kerala state and the Nilgiris, Shevaroys, Palani and the Anamallai Districts of Tamil Nadu.

---

* Director (Quality Control), Coffee Board, Bangalore.

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Indian coffee — both washed and unwashed — has been appreciated in the world market for its quality. Its distinctive presence in world coffee blends has been achieved through effective quality — control measures implemented at all stages of coffee processing, on the estate and at the curing factory.

Even with the recent liberalisation of the Indian coffee industry, whereby the small grower has been provided the option to market 100 per cent of his produce on his own and the large grower 70 per cent of his produce, the quality guidelines and quality assurance would continue to be attended to by the Coffee Board, which has developed expertise in this field over the past very many years.

While the control measure to prepare uniform cup quality coffees for sale will be handled for the 30 per cent coffee being delivered to the Board, the scheme to evaluate the quality of research trials conducted by the research wing of the Board, the laying down of guidelines and standards for Indian coffee and translating the taste requirements of overseas buyers to blend compositions of green coffees would be the forte of the Board. The Board could also provide advisory service to individual growers on all quality matters.

In the past, an individual grower may not have been concerned or aware of the quality of his coffee. Today, as marketing will be carried out by the grower himself and as quality will be the mainstay of any coffee operation, especially when world coffee prices curtail their spiralling ascent and stabilise, knowledge of the inherent strengths and the weaknesses of one's own coffee would reap rich dividends.

PROCESSING :

Adopting correct processing techniques on the estate has been the primary function of the Board, as the intrinsic quality of coffee is established on the estate. Once quality is adversely affected, no amount of processing at the curing factory will improve the aroma and flavour characteristics of coffee.

The accent at the time of harvesting is the picking of ripe berries — 'just-ripe' berries. After picking, the coffee berries need to be sorted, to remove the overripe and green berries, if present. Research over the years has established that the presence of overripes or greens would result in a 'fruity' or a 'raw' cup, respectively.

Only ripe fruits are to be taken for the next stage of processing, namely pulping. Pulping is carried out carefully on the same day of picking, to avoid fermentation before pulping and to avoid the development of brown or foxy beans, which would lower the quality of coffee.

On most estates in India, aqua-washing is carried out after pulping. It is, however, imperative for the coffee grower to return to the old technique of natural fermentation before aqua-washing, which would not only serve the purpose of carrying out the fermentation process with a minimal quantity of water but would also ensure that the aroma and flavour development in the coffee bean is to the maximum.

This stage in processing is to be carefully monitored, as, otherwise, the mucilage, which is full of sugars, would provide a favourable medium for microorganisms, resulting in an 'onion; or 'off-flavoured' cup. The coffee should then be soaked under water to improve its colour, washed a number of times till 'pebble-clean' and then dried.

In India, sun-drying is carried out for coffee. The emphasis in sun-drying is for drying on tiled or concrete barbecues, rather than on mud barbecues. The grower is now aware that drying on a mud barbecue would be detrimental to the quality of coffee, as the coffee bean, which is a highly sensitive respiring bean, would absorb the 'mud' taint, resulting in an 'earthy' cup. In fact, the Coffee Board till recently advanced finance to the small growers to construct and improve their drying yards.

MOISTURE CONTENT :

A critical quality parameter is the moisture content in coffee, which is to be maintained at a prescribed level to preserve quality. The moisture content in Indian Coffee is stringent when compared to world coffees, as it is recognised and established finding that in India the temparature and humidity of the coffee-growing areas are not conducive to a long shelf-life if the moisture content is high.

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Hence, the Indian coffee grower has been advised to dry his coffee effectively, so as to conform to the standard moisture levels prescribed by the Board. However, of late, there has been a tendency for Indian coffee to be overdried, resulting in lifeless coffee beans.

At the coffee estate, the emphasis is to avoid pulper cuts, to prevent the development of stinker or sour beans and to ensure bluish green colour and clean white center cuts. At the curing factory, the second stage of processing is carried out to meet the rigid exports standards laid down for Indian coffee.

IMPROVED TECHNOLOGY :

There are more than 45 curing factories in India, many of them equipped with modern processing equipment to improve and preserve the quality of Indian coffee. The Coffee Board has played no small part in upgrading the technology of coffee curing. Coffee machines available the world over have been evaluated to check on their effective functioning under Indian conditions and only such of those which have been found to preserve and enhance the quality of Indian coffee have been advised for import and installation at the curing factories. It has now been observed that these machines have not only improved the overall quality of Indian coffee but have also reduced the cost of curing.

At the curing factory, the crucial factor of moisture content is once again checked on a moisture meter. If a coffee lot is found to contain moisture above the prescribed standard, it is dried once again. Each grade of coffee is then further processed with care, to conform to the Board's prescribed sorting and grading specifications. The coffee is then packed in jute bags and stored in well-ventilated warehouses.

Indian coffee is sold in the international market based on the size and defect count of the coffee beans. 'Plantation' coffee– a name very exclusive to Indian washed Arabica– is sold as plantation.

A with its region of growth namely Mysore, Coorg, Babubudan or Nilgiris, or as plantation 'B' or 'C'. The nomenclature of A, B or C denotes the size of the coffee bean and the defects that are permissible in the grade. The principal grades of Indian coffee do not permit any defective beans and this has been achieved by selective sorting by machines and by human hands.

QUALITY EVALUATION :

The coffee offered to the international market in the recent past has been those coffees which have been subjected to stringent quality assessment — visual and cupping — by the Coffee Board. The visual evaluation centres around the important quality parameters of moisture content, colour, size and the presence or absence of defectives.Cupping analyses the parameters of cleanliness, strength, acidity, aroma and flavour.

Quality feedback reports, detailing the defects, their causative factors and the preventive steps to be taken by the grower for the future, have helped in improving the quality of Indian coffee. Today, in the liberalised era of 100 per cent Free Sale Quota for the small growers, and 70 per cent for the large growers, the structure of quality evaluation may have to be reexamined for effective implementation.

Through quality control, the Coffee Board has ventured into the preparation of speciality or gourmet coffees. The speciality coffee movement has gathered momentum in the world market with the Speciallity Coffee Association of America being the prime body to bring about this revolution not only in the United States of America but also in the major coffee consuming countries in Europe.

It is interesting to note that even before the speciality movement gathered strength, the Coffee Board had launched the special coffee of Indian Monsooned Malabar and Monsooned Basanally, which are today well known in the international market as coffees having a neutral mellow flavour in the cup.

The overwhelming response to this speciality coffee provided the impetus to the Board to venture yet again into the preparation of a second speciality coffee — Mysore Nuggets EB — a coffee with good body, good acidity and fine flavour, with perhaps a hint of spice to remind connoisseurs the world over of its Indian origin. 'Robusta Kaapi Royale,' another milestone in gourmet preparation, has won the hearts of even consumers who normally do not accept Robusta coffees. These beans, which are prepared from washed Robusta coffees, are bold, bluish grey

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in colour and have that soft but neutral taste, which make it a fine coffee for an Espresso blend.

With this background, the coffee grower can now venture into the realm of estate-marking his coffees to highlight the special quality features of his estate, fetching better prices and carving an indelible niche in the world market.

Value-added coffees : While preparation of coffee from roasted and ground coffee has been traditional, instant coffee has been gaining ground even in certain traditional coffee drinking areas, mainly due to its easy preparation. Many may not be aware that instant coffee with its unvarying taste and quickness of preparation came into its own during the First World War when it was shipped in large quantities to the American forces serving in Europe.

INSTANT COFFEE :

In India, the preparation of instant coffee on a commercial scale commenced during the year 1963 and the quality of the coffee manufactured is of a high standard, prepared from fairly good quality grades. With the installed capacity for production of instant coffee being approximately 19,450 tonnes per annum, the production has been on the increase. From a mere 1,361 tonnes in 1970, it has increased to over 15,000 tonnes in 1994, with approximately 8,000 tonnes being consumed within the country.

In the years to come, the instant coffee scene in India would change from the present spray-dried product to a freeze-dried product of even better quality to cater to the changing taste requirements of the consumer.

Flavoured coffee : With flavour and aroma being the prime requisites of the coffee beverage, flavoured coffees have also gained popularity, especially in the United States of America. Extensive market research conducted in that country has resulted in the launching of high impact flavours, flavoured syrups, liquid flavours, natural and nature- identical flavours to blend with coffee either on the beans or in the cup. After 'Vanilla Nut' being the flavour of the 90's, 'Highlander Grogg' is a recent coffee flavour innovation launched in the US market by the Flavour Technology Corporation of that country.

To examine alternate avenues of promoting the consumption of Indian Coffee, the Coffee Board has been working on a project with the CFTRI (Central Food & Technology Research Institute), Mysore, to develop suitable flavours which could be blended with Indian coffee. The flavours of ginger-orange, clove-orange, ginger-lemon, chocolate-orange, coriander-orange are found to be delicious combinations with coffee, enchancing the subtle and stimulating flavours in Indian coffee. The project has just been completed and the Board would be approaching the Bureau of Indian Standards/Central Committee for foods Standards to formulate necessary standards for flavoured coffee which would permit flavoured roasted and ground and instant coffees to be launched in the Indian market.

The Coffee Board has also recently launched a very reasonably priced blend of pure filter coffee beans in the southern metros of Madras, Bangalore, Hyderabad and Trivandrum. The response to this has been very positive and there are now plans to launch a blend of filter-coffee powder. Both the beans and the powder will soon also be sold to consumers through the Coffee Board's outlets in other parts of the country.

HEALTH CARE :

Decaffeinated and organic coffee : Health and health care have come to stay in most countries in the world. Decaffeinated and organic coffees have become popular.

In India, decaffeination of coffee has not yet taken off on a commercial scale but the day may not be very far off when health-conscious coffee drinkers in the country could make a demand for decaffeinated coffee beans. Organic coffee farming is being practised on a few estates in the country and the developmental strides of this type of coffee remain to be seen.

Being well-brought up at home has positively helped Indian coffee, whether green or instant, to have a high reputation in the world market. The high standards at each stage of processing from the seed to cup, the special attention to quality evaluation and the selection of only the best coffees for export have enabled coffee connoisseurs round the world to enjoy the superior and fine taste of India's aromatic coffees. After all, this is the hallmark of Indian coffee — rich traditions and a richer taste.

—THE ECONOMIC TIMES

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NEW CTC MACHINE CALLED KAIZEN

T and I Ltd (TIL), the Assam-based manufacturer of tea machinery and the only exporting industrial unit in the State, has launched the latest version of the CTC machine, Kaizen, which has got definite advantages over the earlier CTC machines of the company such as Teatops, Innova, Innova-2 and Sennova.

The Kaizen CTC machine was formally launched by TIL near Rangapara in Sonitpur district in Sheoparshad Mahendraku mar's Kolony tea estate in the presence of a representative gathering of planters, technocrats and traders in tea from all over the State.

Though formal launching of the Kaizen took place at Kolony tea estate, the first user of the machine was Deckiajuli tea estate of Parry Agro Industries Ltd., where it was installed in November last year.

The Deputy General Manager of Parry Agro, Mr. S. Sindhu, at Kolony tea estate, said the new machine was easy to operate, almost silent with minimum spillage and adjustable to suit the needs from 1,000-1,400 kg of withered leaf depending on the market and seasonal requirements.

The Managing Director of TIL, Mr. Vijay Bagaria, said the machine was dedicated to the future of the tea industry. Though Kaizen was a Japanese concept of management and work culture signifying 'constant improvement', there was no Japanese tie-up in technology in the project, he said and added that it was the result of years of hard work of the research and development wing of the company which was completely indigenously manned.

He said the machine was conceptualised and designed by the R & D wing with the main objective being quality and was the culmination of the highest standards of engineering, performance and the end product.

As the demand for quality tea grows and the pressures to curtail manufacturing costs increase, state-of-the-art machines and technology assume a vital role.

He said, "In creating Kaizen, we have endeavoured to look into those seemingly insignificant areas of CTC manufacture where quality can be made or destroyed. The machine engineered for almost zero spillage, elimination of downtime and to make maintenance almost free".

Some of the improved features of the new machine are its unique cutting unit cover, better and long-life conveyor belt, zero spillage, heavy duty construction, reduced machine height, centralised lubrication system, self-cleaning system, fast roller removal, superior gear box, improved clutch, suction cooling and chain and sprocket drive for conveyors.

It comes in three sizes of 30', 36' and 42' with rated output of 1,000, 1,200 and 1,400 kg per hour.

Mr. Vijay Bagaria later told Business Line that the T & I Ltd, now a public limited company, was floated in 1949 by the Bagarias of Tinsukia along with another outfit, Steelworth.

The two companies and Andrew Yule were the only manufacturing units of tea machinery and equipment.

While Steelsworth and Andrew Yule diverted to other interests in course of time, TIL concentrated not only on manufacturing tea machinery and equipment, but also on developing more efficient machines in its R & D wing.

The company was the first in the north eastern region to take the quality circle where it was registered as the 151st member.

As for the performance of the company, Mr. Bagaria said the sales turnover in 1994-95 was Rs. 18 crores of which 34 per cent was export earning.

The current year's sales target has been fixed at Rs. 23 crores, 60 per cent of which is to come from export.

He said the export clientele was spread over all the tea producing countries of the world, led by Sri Lanka, Kenya and Indonesia.

He said TIL had stepped far ahead of the other two firms in exporting tea machinery.

Asked about the home market of tea machinery, he said there was a huge price deferential which might act as a deterrent for a small planter to switch over from the conventional to the Kaizen CTC machine, but it should not create problems for the tea majors, for sooner or later they have to opt for producing high-quality with the latest and the most efficient machine in terms of quality to compete in the global market.

A renowned planter and former president, Assam Tea Planters' Association, Mr. J.K. Barooah, said it was inconceivable to be competitive in the global market without taking adequate measures to improve quality even though they may be highly expensive.

He said, "organisations such as TIL with dogged determination and highly efficient research wing can come to the help of the industry".

He said the company had decided to diversify into tea plantation. To begin with, it has already acquired a plantation property over 700 acres of land in North Bengal under a new corporate outfit T & I Global Ltd.

— BUSINESS LINE

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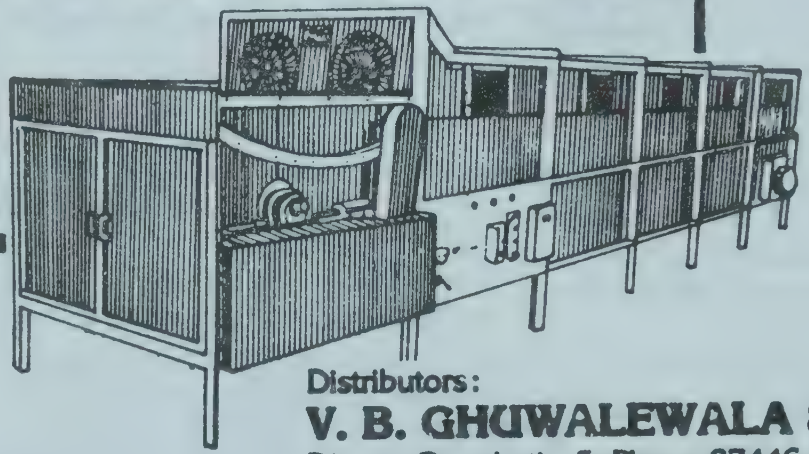

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LIBERALISATION AND THE YEARS TO COME

It is almost unbelievable but true, that due to liberalisation, in the next few years and certainly before the end of the century, we will have added more capacity to make steel than in the years of planning and control since Independence. Earlier, we would sell our iron ore to the Japanese, who would import coal from Australia, convert these into steel and then ship the steel back to us — cheaper of course, than we could make it ourselves. Now with an efficient utilisation of our ore and coal reserves, with an abundance of skilled labour willing to work hard, India will emerge early in the next century as a leading steel producer in the world.

This sounds almost simplistic, but the same story will be repeated in industry after industry. It is almost ironic, that it is those very areas — electronics, telecom, power, aviation and textiles — for which there have been special ministries, that are proving to be the boom areas with decontrol. Unfortunately, this simple lesson has not yet been fully absorbed by many of our politicians and bureaucrats, who have half-heartedly accepted a certain amount of decontrol, but hang on to many unnecessary controls and regulations. In many fields, and not just in services, we have a comparative advantage and ought to be able to secure our fair share of world trade.

Needless to say, this will not happen automatically. Indian entrepreneurs will have to focus their efforts, work in a dedicated manner, acquire the newest technologies and learn to deal with international markets. They will have to be able to take on their international competitors not only in India, but also Overseas. Unfortunately, it is also true that many Indian businessmen and Indian politicians do not believe that Indian businessmen can actually do this. This is one of the main reasons why these businessmen and politicians are opposed to multinational companies freely entering the Indian market.

But, clearly there are businessmen and businessmen. Obviously many find it difficult to work and thrive in a competitive environment. But the logic of markets also is that not all can succeed and that some people are bound to fail. In the next few years there is going to be a shake out. Some will sell out to Indian or foreign companies while others will simply fail. And it would be wrong for governments or banks to bail out failing enterprises. There is also no doubt, that while some of the established names in Indian industry will disappear (either due to sale or failure), we will also see the emergence of a whole new slew of entrepreneurs who we haven't even heard of today.

— EXTRACT FROM BUSINESS INDIA.

AND NOW, IT'S TEA . . .

After soft drink concentrates, it could soon be the turn of tea concentrates in India. You can choose your favourite flavour, mix it with the concentrate and enjoy a mild and stimulating drink.

Scientists at the Council for Scientific and Industrial Research (CSIR) Complex, Palampur, have developed a technology for making tea concentrates with flavour as well as basic concentrates with an option for the consumer to add any flavour.

Dr. Ravindranath, a senior scientist of the Complex, told *Business Line* that the technology, fully demonstrated at the laboratory scale, can be easily adapted to existing jam or squash units to produce tea concentrates.

Tea concentrates have not yet hit the Indian market. The technology, if up-scaled by the industry, can be turned into a lucrative business. "We see it as a good bet for the cottage industry at the moment," he said.

Internationally, Coca-Cola and Nestle have already launched successful brands called 'Fruitopia' and 'Nestea', especially in the Japanese market. Both of them are fruit-flavoured mild teas, which are supposed to have excellent thirst-quenching properties. These brands were launched last year and are said to have gained a tremendous market share in the bottled tea segment.

With tea-drinking habits showing a decline with the advent of a wide range of fresh soft drinks and their concentrates, perhaps flavoured tea concentrates could find their own niche.

The CSIR team is, at present, engaged in improving the flavour of the once popular Kangra tea, which has been revived in the State during the past few years.

In the intensely competitive tea markets, Kangra tea has been losing out to Darjeeling varieties because of the season, both varieties are of the same quality, but as it progresses, the Kangra one loses its flavour and quality, Dr. Ravindranath said.

The only way to solve this problem is to decrease the processing time of withering from the present 16 to 18 hours. The CSIR scientists claim they have developed technologies that will improve the colour and shorten physical and chemical withering to just four hours.

— BUSINESS LINE

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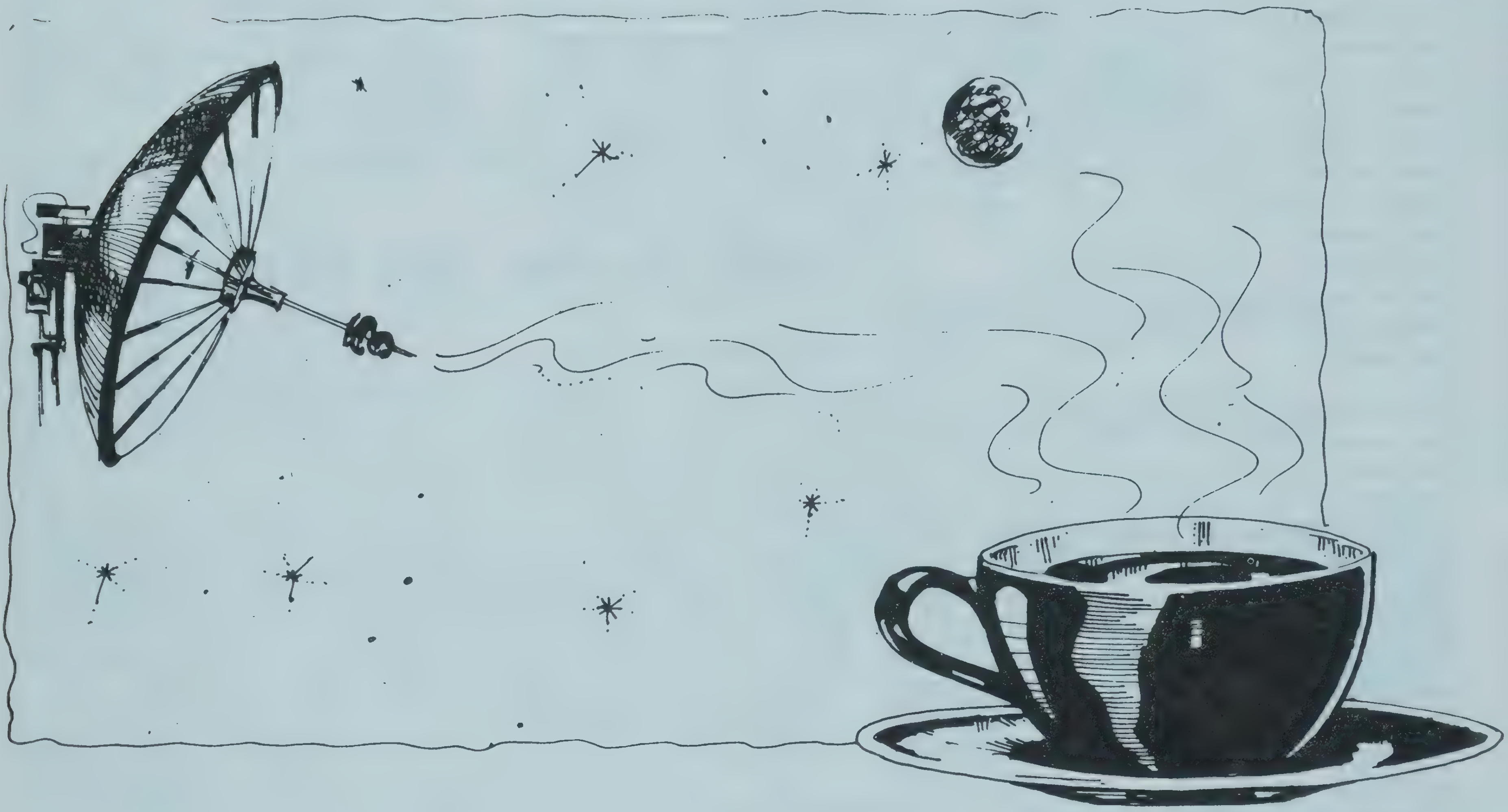

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WHY SHOULD BUSINESSMEN AND ASSOCIATIONS INVOLVE IN ANYTHING OTHER THAN BUSINESS!

D. RAVINDRAN*

Most of those who advocated the trickle down theory are now not sure whether that theory works in India. There are thousands of villages which have yet to receive the trickle down benefit from planned development, i.e., basic needs, such as, drinking water, medical facilities, schooling and an occupation to earn the bare minimum to make both ends meet. Why talk of villages. Even in cities the poorest of the poor have no access to drinking water, medical facilities, a place to stay and a regular income. It is also accepted by many that looking at the magnitude of the problem, Government is not capable of even finding partial solutions to their problems. Further, the reach of voluntary agencies being extremely limited compared to the size of the problem, the problem would countinue to remain.

With rampent corruption in Government agencies dealing with welfare schemes and more so in the far flung villages with hardly anybody to question, the lot of dumb millions in many villages is really deplorable. It is not merely lack of funds. Whatever funds are spent for them do not lead to betterment of life on a long-term basis. For example, food for work. True, it meets the basic and urgent need of the day. But the fact remains that the moment it is stopped, there is nothing for them to look for. Lack of guidance, lack of schooling and medical facilities lead to their perpetuating the present day miserable life. Hardly there is any escape route.

Unwittingly in India, management has been identified with business management. But all of us realise that management is an essential need of a government agency or educational institution or hospital. Or even a village development. Leadership and finance are the two other inputs required for better management of any activity.

It is from this point of view that businessmen can supplement more effectively the efforts of Goverment and voluntary agencies in reaching the poorest of the poor with guidance, finance and leadership. One does not have to over-emphasis. The question is, between government and voluntary agencies on the one side, and business organisations on the other side, who would be able to do a better job? It is not necessary for the businessmen to ignore what is being done by the government or voluntary agencies. The required leadership and management could be provided by the businessmen to co-ordinate the activities, put in a little cash where required and be the real catalytic agent in improving the economy of many villages. Such involvement of businessmen could reduce the syphoning of the money earmarked by Government for welfare activities.

Businessmen and corporations create wealth through production or fulfil a vital part of the economic management of conducting commerce. They produce goods, give employment, increase the revenue to Government and earn foreign exchange by exporting goods. By setting up factories, they improve the economy of the area where the factories are situated. Full or part of the funds required to build hospitals, schools, temples and such other institutions in the vicinity of the factories are provided by them, activities which, apart from creating goodwill of the people in the area, may only have insignificant positive effect on the business they are conducting.

In a country where unemployment is rampant, a large percentage of the people fall in the category of poor, economic progress is slow, foreign debt is immense and Government's need for revenue is great, businessmen deserve acclaim for their contribution to reduce the severity of the problems. They would be right in saying that if only a large number of people in the country contribute as much as they do in improving the economy, then part, if not full, solutions would have been found to the major problems afflicting the country.

"The business is business" so said somebody and there is lot of practical wisdom in it. Leave each activity to the persons who would do it successfuly. Why should they be asked or even expected to be active in an area where they do not have much knowledge and more so when their heart is not for such activities. In brief, businessmen should leave activities other than business to those agencies which know how to undertake such

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* Secretary General, UPASI.

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activities. There is the Government. Then again there are voluntary organisations. They cannot be managed in a business way. So it would be better to leave businessmen out of it.

All the above statements are correct.

But let us look at this matter from a different angle.

Decision taking capacity, leadership, knowledge of management and result orientation are the four parameters in which business score over the Government, and when it comes to various welfare activities the failures of the schemes are largely due to inadequacy in these areas. And that is why businessmen could step in to correct the trend.

Many of the social welfare schemes are implemented without adequate preparation or thinking of the problems and obstacles, whether the same would really bring benefit to the intented beneficiaries, whether the funds are adequate to take up the job. Planned, whether the time span worked out is realistic etc. It is because of this often the funds allotted are not fully spent. In such schemes, the lower rung of bureaucracy is involved, so also the local politicians. There is tension, mistrust, groupism and favouring, apart from symphioning of money. Involvement of businessmen could largely improve the situation. No doubt, there would be occasions when they would be drawn in the local politics. There is a price they have to pay for doing something good.

CRY, SOS, Jaipur Foot — all doing good service for the needy. But they are not able to touch even a fringe of the problem. Apart from the lack of funds and lack of volunteers one main limitation of these organisations is the lack of ability to mobilise funds.

This naturally restricts their scope of activities. Businessmen are the best to guide them on this matter, particularly from foreign sources. World is full of people with money. And many of them are prepared to spend it for the worthy cause. This source is not fully tapped because the matter has not been properly approached.

The fact remains that businessmen have generally shown apathy to take up such causes. The public sector is worse. Managed as they are not for personal empire building they have a better opportunity to take up such projects. No Board is going to object to the public sector enterprises taking up such causes. Unfortunately most of those who man these enterprises want to out do businessmen in achieving profits and growth. Nothing wrong with that. But the point is that most of them being run by administrators, unlike businessmen, they had while serving as District Collectors had contact with social service and welfare activities. They are not like businessmen for most of whom such an activity will be not a path they had traversed. Secondly, the personal conflict of businessmen of whether to devote time and funds for his enterprise or for that of the community is not there with the chiefs of public enterprises. Yet most of them have the wrong notion that they must run it as businessmen do and as businessmen do not do much in such areas they should also not enter into such an area.

A country progresses not merely from development projects. This is important. But equally important is to develop arts and culture. Painters, musicians, novelties, cine artists and others make life more enjoyable. They add flavour to material comforts. To achieve inner peace wealth and health are not sufficient. And the lack of encouragement or having no patron, stops budding talents from developing and growing. A visit at the Triveni Kala Sangam in Delhi where budding and amateur artists' exhibit their products bring out this matter in clear focus. There is undoubtedly talent in the country. But very little encouragement. Quite often in the pursuit of a degree, a job or an avocation an artist has to compromise on spending time and making efforts to develop his or her artistic skills. In a job-oriented society, these are if not frowned upon at least given very little room to develop.

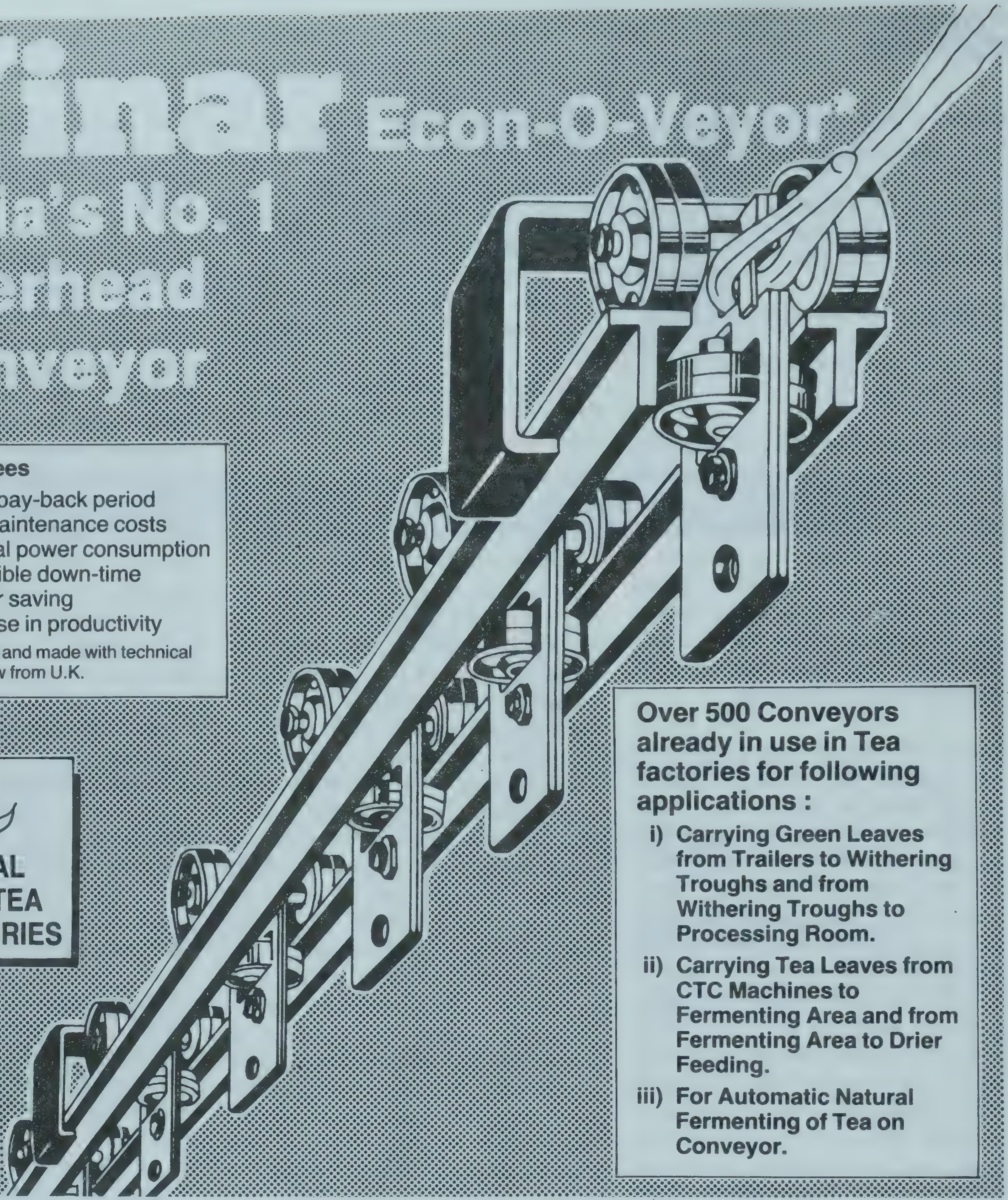
Take any school. There would be genuises in a number of areas. What happens to them. They don't get any scholarship for pursuing their artistic skills. Scholarship is generally reserved for those who are studious or getting excellent marks. A future football star or painter or a singer is lost in this degree and job-oriented society.

HORIZONS '96

INTERNATIONAL COFFEE CONVENTION

An International Coffee Convention is being organised to be held in Bangalore on 11th and 12th January 1996 jointly by the United Planters' Association of Southern India (UPASI) and the Coffee Board. In addition to coffee growers and buyers from abroad, leading traders/roasters fro USA, Europe and Far Eastern countries are also expected to participate and share their knowledge and experience in the Coffee World.

For details regarding the delegates' registration procedures, fees, etc. Please write to the Secretary General, UPASI, Coonoor - 643 101.



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Attitude

Would it be difficult for every industrial establishment to search and locate such budding talents and make it worthwhile for them to pursue their God given gifts. Actually the cost involved would be a piffling. What is required is an understanding of the situation and a keenness to do something about it.

Causes are plenty in this country and for that matter anywhere in the world. Greening, eradication of illiteracy, succour to lepors, a Jaipur Foot, a home for the old and invalid who do not have anybody to care for. The list is quite long. And there is no way for Government, structured as it is, to reach them. Elsewhere in the world many rich people while living or at the time of death through their Wills make available huge funds for such causes. This apart, there the social security schemes are quite good. What about our country. Neither of these are there.

To many in this country, particularly the youth, MRF is known more as a company which encourages cricket. It also produces tyres. DCM is known for the football tourney. Bhilwara for chess. TISCO for allround development of the area. Mafatlals for religious and social upliftment activities. Birlas for temples. Poddars for educational institutions.

"Industry should use modern technology and management skills at its disposal to assist in modernising our agricultural and rural economy. I once calculated that there are nearly 130 districts in our country which receive an annual rainfall of less than 1125 millimetres and where there is heavy concentration of poverty. I appeal to captains of industry to adopt some of these districts so that modern technology and management can be harnessed to soften the harsh edges of extreme poverty." So said Dr. Manmohan Singh, Union Finance Minister while addressing a meeting of businessmen.

At the end of the day think of the light and cheer you as businessman had brought to an amaetuer artist, the hope you have given to a person who had his foot amputated of leading a normal life with an artificial foot, the confidence you have given to tomorrow's athlete star, the greening you have given in the vicinity of the factory and the satisfaction that you are not only a successful businessman but contributed your mite to a worthy cause. Everybody cannot become Mother Teresa or Sunderlal Bahuguna or Medha Patkar. They are saints. But can't you emulate them.

PERSONALIA

KDPA CHAIRMAN

Mr. M.A. Ganesh of New Ambadi Estates P. Ltd., Kulasekharam - 629 161 was elected Chairman of the Kanyakumari District Planters Association from July 1995. The other office-bearers are : Messrs. GeorgeC Moses (Vice-Chairman), A.L. Subramanian (Secretary and Treasurer) and C.R. Chentil Kumar (Joint Secretary).

HDPA OFFICE-BEARERS

Dr. N.K. Pradeep was elected President of the Hassan District Planters' Association for 1995-96. Mr. K.N. Era Nanjappa was elected Vice-President.

The other members of the Committee are : Messrs. H.N. Devaraj, M.B. Lakshman, B.M. Bhoomesh, M.B. Manjunath, H.P. Ramachandra, H.N. Alva, U.M. Puttaswamygowda, H.A. Madhu Rao, H.A. Manzoor Ahmed, K.R. Mallappa, L.S. Gidda Basavegowda, L. Mendanza, A.J. Zahoor Ahamed, U.M. Thirtha Mallesh, M. Venkatesh, S.M. Shantha Mallaiah Patel, K.N. Mallegowda and K.N. Basavaraju.

WORKSHOP ON TROPICAL ORGANIC FARMING

A 2-day National Workshop on Tropical Organic Farming is being organised by the UPASI R & D Centre on 1st and 2nd September 1995 at Hotel Aida, Kottayam, to reinforce the organic farming movement which was initiated a few years ago.

The main theme would be to showcase workable organic farming technologies as well as highlight the methodologies adopted by successful organic farmers. The marketing systems for organic farm products, certification and export promotion, etc. will also be deliberated upon.

The details regarding registration fees are given below :

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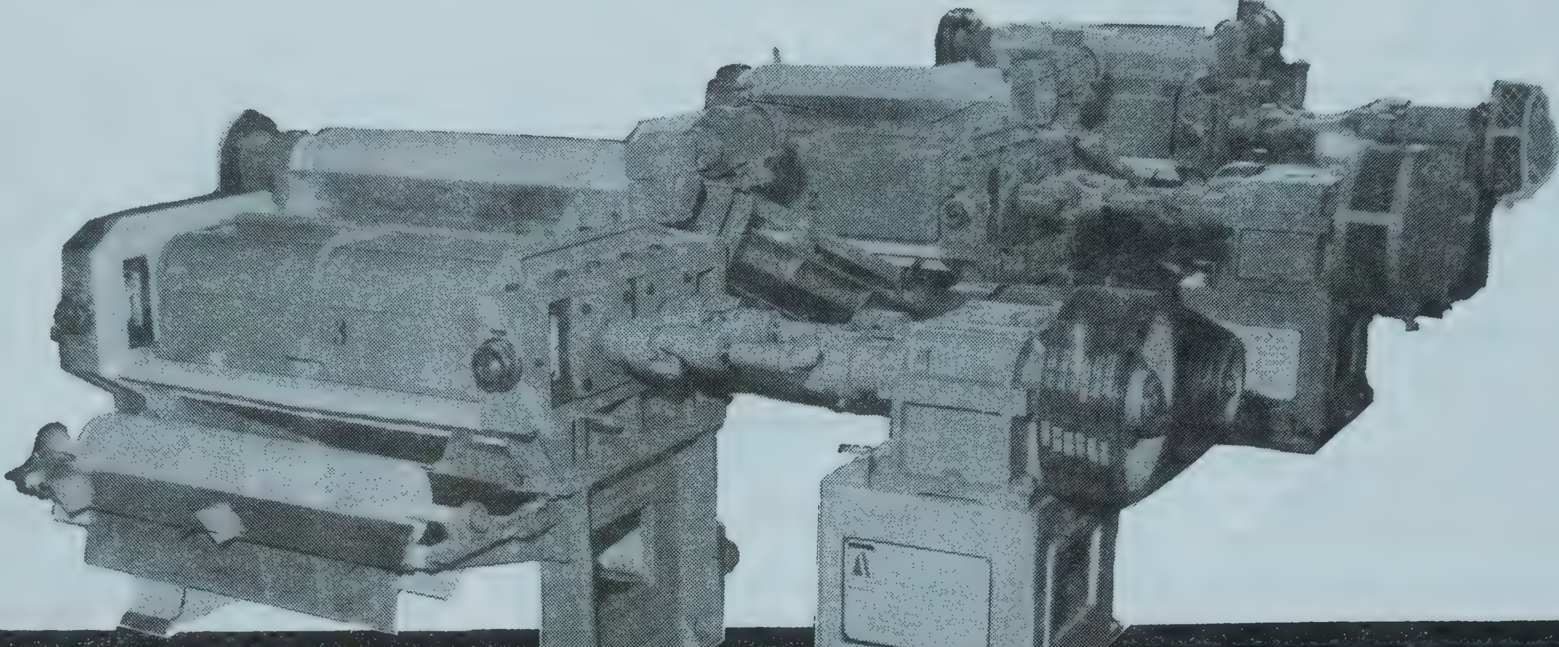

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DRINK TEA TO STAY HEALTHY AND CANCER–FREE

Drink tea and stay healthy. That's the message that came out of the five-day annual conference of the American Association for Cancer Research (AACR) held in Toronto recently.

"Tea drinking can actually help prevent cancer formation in the human body,'' said conference participant John Weisburger of the American Health Foundation (AHF) who has been doing research on this subject for the last five years. "We have done amazing progress in establishing connection between tea and health and how tea drinking affects the human cells." Tea drinking helps prevent skin cancer, lung cancer and other forms of cancer, he told the 6,700 delegates from 40 countries who attended the conference.

The positive effects of tea drinking have been demonstrated reasonably well that we can now recommend it to the public," Dr. Weisburger said.

There are three stages at which scientists deal with cancer, said Dr. Ram P. Agarwal of the University of Miami School of Medicine — prevention, early detection and actual cure. Tea drinking is part of preventive method, said Dr. Rishab Gupta of John Wayne Cancer Institute in Santa Monica (California). Taking of aspirin a day is part of the same preventive method. There are fresh fruits, vegetables and food with a high fibre contents also recommended as a prevention against cancer.

For early detection scientists now recommend regular physical and regular blood and urine tests. Any cancerous growth in the body can most likely be detected in blood test, claimed Dr. Krishna C. Agarwal of the Department of Pharmacology of School of Medecine of the Tulane University Medical centre. "Early detection is possible through modern clinical technology," said Dr. Gupta. But more researches are still needed in this regard, he conceded. "Genetherapy is part of early detection," Dr. Krishna Agarwal said, and prevention comes through micronutrients.

The last stage is cure and that's through surgery, chemotheraphy and gene theraphy. Dr. Agarwal said.

He is currently conducting research on effect of cells from low-level radiation. The funding for his research is coming from the US defence department. "The defence department is interested in analysing effects of low-level radiation on astronauts," Dr. Agarwal said. " Astronauts are exposed to low-level radiation. Our interest is to find out how they can be protected from harmful effects of low-level radiation'', he said. Low-level radiation is cumulative. It keeps on building inside the body. If you continue to receive it regularly it can cause problem, he argued.

According to Dr. Lilian Thompson of the University of Toronto, the war against cancer starts at the breakfast table. Her research shows that a compound found in flaxseed may either delay or slow the growth of cancerous tumours. Flaxseed, also called linseed, is present in milled from in some breakefast cereals.

Dr. Thompson has demonstrated that lingnin, a compound found in flaxseed and some fruits and vegetables, can reduce the growth of breast cancer tumors by more than 50 per cent. India has low incidence of colon cancer due to regular consumption of fibre-rich diet, said Dr. Agarwal. Breast cancer rate among Indian Women is also low, said Ram Agarwal. "Indian girls get married at an early age, they get pregnant also at a comparatively early age and breast feeding of baby helps prevent growth of breast cancer," he argued on the basis of researches being conducted in a number of institutions in India and outside.

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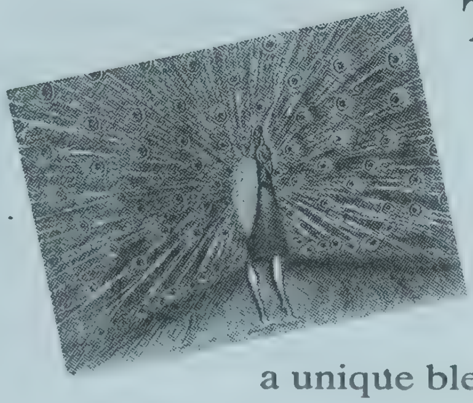

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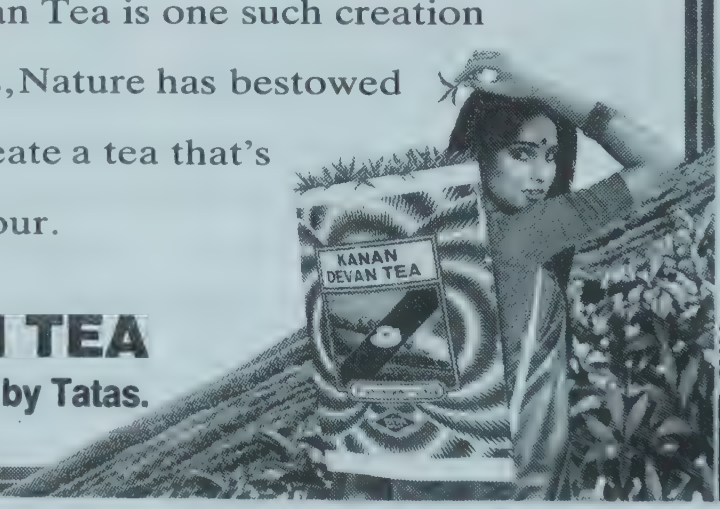
KANAN DEVAN TEA
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In the western countries breast cancer is a major problem as women get married late, don't want to have babies and hardly believe in breast feeding. Also women who eat lots of fat have dramatically higher levels of breast cancer-causing hormones than those with leaner, fibre-rich diets, argued Dr. Lovell Jones of M.D. Anderson Cancer Centre in Houston. "People have been looking at mechanisms by which fat has or can have an influence on breast cancer," he said. His research has demonstrated for the first time "that a low-fat diet has a direct effect on estrogen levels," Dr. Jones argued that eestrogen is the most significant common denominator in breast cancer, outweighing all other genetic and environmental factors.

Dr. Ram Agarwal said "there should be moderate food consumption avoiding high fat diet, and fibre intake should be increased to avoid colon cancer." There should be more vegetables and fresh fruits consumed part of your daily diet. Food should be with less presservative, less consumption of meat, he stated.

But there's a very high rate of oral cancer in India and that these Indian-American scientists attributed to consumption of tobacco and betal nuts. Betal nut has arecoline, a cancer causing compound, said Dr. Krishna Agarwal.

The conference delegates heard results of new findings that "baby aspirin" a day can suppress chemicals produced by the body that are suspected of playing a role in colonic and rectal cancers. Dr. Mack Ruffin of the University of Michigan Medical School in Ann Arbor said that previous studies have indicated that people taking acetyisalicylic acid, commonly known as aspirin, for a variety of chronic illnesses seem to be at the reduced risk of dying from coloctal cancer.

— **Ajit Jain, Indian Abroad News Service.**

— INDIAN EXPRESS

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FAO ON TEA

The Eleventh Session of the Intergovernmental Group on Tea was held in Rome from 10 to 13 April 1995. It was attended by 78 delegates from Argentina, Bangladesh, Burndi, Canada, China, the European Community, Germany, India, Indonesia, Iran, Ireland, Italy, Japan, Kenya, Mauritius, Morocco, Netherlands, Pakistan, Rwanda, Saudi Arabia, Spain, Sri Lanka, Tanzania, Thailand, Turkey, Uganda, U.K. and U.S.A. Observers from the International Trade Centre UNCTAD/GATT and International Tea Committee were also present.

All the discussions related only to black tea and a gist of the discussions is detailed below :

Current Market Situation and Short-term Outlook

Producers expressed concern on :

- Demand increase not keeping pace with suply increase; and
- Drop in price realisationof tea in real terms during the last decade.

  Suggested action plan to tackle these issues were :

  a) Canceric Promotion

  b) Quality Enhancement

  c) Product Diversification

  d) Idantification and development of new markets

  e) Expansion of new types of consumption

Longterm outlook

Among the importing countries, major consumption increases were evidant only in developing countries (increase of 3.5 per cent annually) while import demand in developed countries increased only by about 1.5 per cent.

The FAO projection for the year 2005 in respect of global net imports is 1,394 m.kgs as compared to the average of 968 m.kgs in 1991 -93. The FAO Global production estimate for the 2005 stands at 2,833 m.kgsagainst 1909 m.kgs during 1991-93. The total world consumption (both in producing and in importing countries) is estimated by 2005 at 2,766 m. kgs, leading to a surplus of 67 m.kgs. by that year. The FAO estimates that Indian production by 2005 will reach 1,019 m.kgs. of which 250 m.kgs will be exported and 788 m.kgs will be consumed domestically.

Among producing countries, major consumption, increases will come from India and Turkey. In the case of importing countries, the FAO document anticipates major growth in cunsumption from Pakistan and Egypt. Although FAO projection do not show any significant increase in USA and Canada, the papers presented by account of the gaining popularity of ready to drink tea and benefitial results for promotion of tea as a health drink. CIS and Iran are the producing cum importing countries where demand is likely to go up cosiderably.

While discussing the way and means to overcome the adverse effect of the amersing surplus situation, the meeting recommended considering the possibility of eliminating the excess of supply starting from the low quality tea not conferming to ISO 3720 standard.

An informal meeting of representatives of the producing and consuming countries suggested that FAO should prepare an econometric model to evaluate the impact on prices, of changes in production and consumption. This, it was mentioned, could provide a basis for assessing policy options to be considered by exporting and importing countries.

While discussing the production trends, there was no consensus on the suggestion to cut-back production. However, major producers like Kanya and Sri Lanka stated that they have no plans to expand areas under tea and that increase in production could only through better productivity.

Project on Tea Consumption and Human Health

The required funding for this Project has now been made available, the project cost has been cut by $ 593,000 and Common

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Fund has agreed to contributr additionally 200,000 us $. The break-up is as under :

	US $
Common Fund	1,920,000
UK, USA & Cannada	1,950,000
India, Indonesia, Sri Lanka, Kenya	726,800
Total	4,596,800

The formal agreement is to be signed between FAO and the funding agencies/countries. The project details, time table and type of reporting to the members are to be finalised. The project is be based on the original document prepared.

It is noticed from the figures that India share towards this project has been brought down to $ 565, 240 from $ 808,047. There could be oppurtunities for some of the research to be conducted by Institute in India.

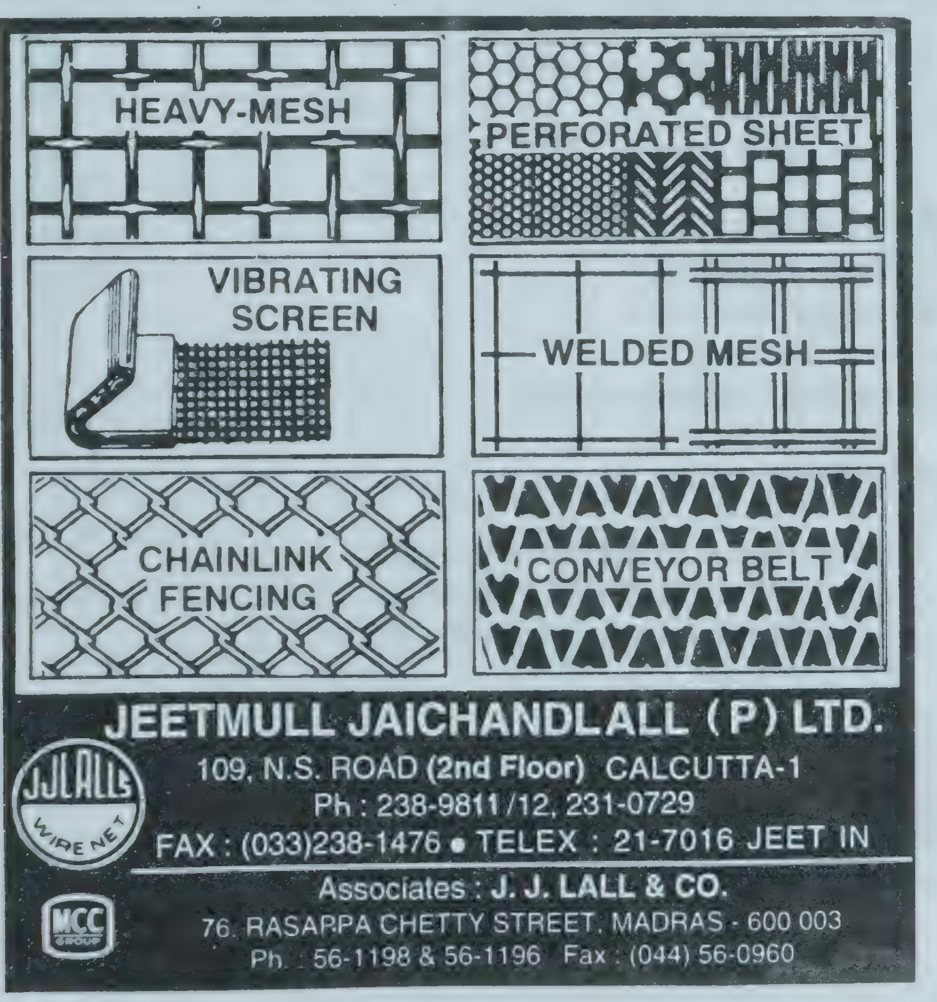
Quality Standered for Export Teas

It was agreed that even though ISO 3720 was only a very basic standered for the black tea, it could be used as a basic for developing future standereds of tea. In the interim, it was suggested that all exporting countries adhere to ISO 3720. It was felt that such action would result in the removal of a sugnificant quantity of sub-standard teas from the international markets. It was stressed that the adherence to this should be monitered at the point of origin.

Presently, only Germany, among EC countries. enforces certain standerds on pesticide residue. A new directive on Pesticide Residue has been formulated for the adoption in the EC countries.

It was indicated by Germany that the revised standards will be implemented by september 1995, although the earlier indication was that the effective date would be sometime in 1998. It is very likely that residue limits will also be formulated and enforsed for other commodities like pepper. It was mentioned that there would be inspection on eantry and that the importer would have to provide theinspection report under ISO 9000 system. This could have a bearing on export of tea and other agricultural commodities to EC countries.

— M.M. Venkatachalam and P.K. Pani.



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AN INSTRUMENT FOR DETERMINING THE FREE FLOW BULK DENSITY OF BLACK TEA

V. RAMASWAMY*
UPASI Tea Research Institute, Valparai - 642 127

INTRODUCTION

Bulk density is one of the quality attributes which partly decides the value and the marketability of the black tea. It has been established that bulk density positively influences the cuppage (number of cups per kilogram of tea) of tea (Ramaswamy et al. 1993)+. The bulk density is also important in determining the packaging and transporting cost; heavy density is desirable to reduce transport costs and packaging volume for shipping. Thus density control is essential while processing black tea. Bulk density could be influenced by various means like moisture content in the dhool, quantum of broken tea (recycled material) and cutting efficiency. It is known that south Indian CTC market demands heavy density, grainy teas without affecting the blackness.

Bulk density is defined as the ratio of mass to volume. Bulk density can be expressed in two ways;

1. free flow (or uncompacted) density.
2. tapped (or compacted) density.

Free flow bulk density is measured as ratio of the mass of tea to the volume it occupies after it has been tipped freely into a container under specified conditions. It is expressed in kg/m^3. Compacted bulk density is defined as the ratio of the mass of black tea to the volume it occupies after it has ben subjected to a number of taps under specified conditions. It is also expressed in kg/m^3.

Attempts were made to standardise the design of a mechanical apparatus for measuring the 'free flow bulk density' (FFBD) of black tea. Effects of the various design parameters ol the free flow bulk density of black tea are also discussed.

DESIGN AND CONSTRUCTION OF BULK DENSITY APPARATUS

The apparatus essentially consists of a funnel, a receptacle and an overflow collection vessel.

The principle of operation of FFBD apparatus is the pouring of tea sample from a specified funnel into a specified receptacle of known volume and weighing the concents of the receptacle.

The sketch of this apparatus is shown in figure 1. The following design parameters are considered for evaluating the performance of the apparatus.

1. Height of falling (H)
2. Height to Diameter ratio of the receptacle (L/D ratio)
3. Inner diameter of the funnel at the dropping point (d).

The height of falling influences the compactness of the tea in the receptacle and thereby the bulk density. L/D ratio also affects the bulk density in a similar way. The inner diameter of the funnel at the dropping point controls the rate of falling and therefore likely to influence the density.

Table 1 shows the value of the design parameters chosen in this experiment.

The volume of the receptacle is made constant (500 ml) for different (L/D) ratios. All the components of apparatus were made of stainless steel. The capacity of funnel is 800 ml. Three grades of CTC teas (BP, SRD, SFD) were tested for density by using this apparatus.

OPERATION

Each measuring receptacle is weighed to the nearest 0.1 g. The dropping point of the funnel is closed manually with a small steel plate and tea is poured into the funnel. The size of the sample is greater than that needed to fill the measuring receptacle. The steel plate is removed from the bottom of funnel and the tea is allowed to the flow into the measuring receptacle. When the recetacle overflows the surplus tea is levelled off at a single storke using a spatula or a suitable scraper. Accidental tapping or vibration of the filled measuring receptacle should be avoided. The measuring receptacle is removed from the overflow collection vessel and the outside cleaned of any tea particle sticking on it, by using a nylon brush. The weight of the filled measuring receptacle is weighed to the nearest 0.1 g. From this, the mass of the measuring recetacle is subtracted to obtain the mass of the tea sample it contains. Three determinations are made for each combination.

---

* *Present Address :* **Protchem Industries (India) Ltd., Abishekapakkam, Pondicherry - 605 007.**

The free-flow bulk density, expressed in kg per m^3 is equal to

$$(m/v) \times 1000$$

where

m is the mass, in grams of the sample contained in the measuring receptacle. v is the capacity of the measuring receptacle up to the brim in ml.

RESULTS AND DISCUSSION

The results of the experiment are summarised in Table 2. The following points have emerged from this study.

1. Height of falling increased the density of larger sized particles (BP), irrespective of the diameter of funnel and L/D ratio of receptacle. However, height of falling did not alter the density in finer grades (SFD). The height of falling increased the bulk density of RD grade when the flow rate was low (d = 12.5 mm).
2. The configuration of receptacle influences the bulk density significantly. The density is lowest at the L/D ratio of 1.25 under different funnel dia and falling heights. At the same time, an L/D ratio of 3.0 increases the density in both the larger as well as the finer particle sizes. The reason is that narrow vessel improves the compactness of tea particles falling into the receptacle.
3. Under low rate of falling (d = 12.5 mm), the density is high. However, as the particle size is reduced the trend is reversed. But in all the grades, medium rate of falling (d = 16.5 mm) reduced the density.

The objective of the study was to select a combination which gives the highest density so that it could represent the packaging volume more accurately. From the above discussions it appears that when d = 12.5 mm and L/D = 3 the density is rather high. Having considered the different heights of falling and grades with the above combinations, H = 600 mm seems ideal.

CONCLUSION

The following parameters were found ideal in the study

d = 12.5 mm

L/D ratio = 3.0

H = 600 mm

This apparatus will be useful in the tea factories to check the density of all the grades of CTC teas. It is suggested that the density of all the invoices are measured so that if any reduction is noticed, corrective measures can be adopted in the process. Thus, the apparatus will be a useful tool to measure one of the important quality parameters in tea processing.

+ Ramasamy, V., Rajendran, A.R., and Raju, K. 1993. To add or not to add. UPASI Sci. Dep. Bull. 46 : 132-143.

Table 1 Design parameters

S.No.	H mm	L/D ratio	'd' mm
1.	300	0.65	12.5
2.	450	1.25	16.5
3.	600	3.00	22.5

Table 2. Bulk density of tea* [kg/m^3]

Funnel dia	Falling height	BP L/D ratio			RD L/D ratio			SFD L/D ratio		
		3	1.25	0.65	3	1.25	0.65	3	1.25	0.65
12.5 mm	300 mm	421.7	416.3	421.3	520.0	515.3	524.3	562.0	555.0	561.0
	450 mm	426.3	420.3	428.3	530.0	520.7	529.0	568.3	555.0	562.3
	600 mm	435.7	426.0	432.3	533.3	537.3	532.3	562.0	553.7	561.0
16.5 mm	300 mm	405.0	400.0	402.0	522.0	510.7	529.3	560.0	548.7	555.7
	450 mm	407.0	401.3	404.0	520.0	508.0	523.3	559.3	549.3	555.7
	600 mm	416.3	406.0	414.0	516.0	507.0	522.0	560.0	549.0	559.7
22.5 mm	300 mm	401.0	390.3	394.0	524.7	512.0	522.0	567.7	555.7	561.0
	450 mm	403.7	393.0	396.0	523.3	517.7	514.0	567.7	554.3	562.3
	600 mm	405.0	397.3	401.3	524.7	513.3	516.0	568.3	559.7	563.7

* Average of three determinations

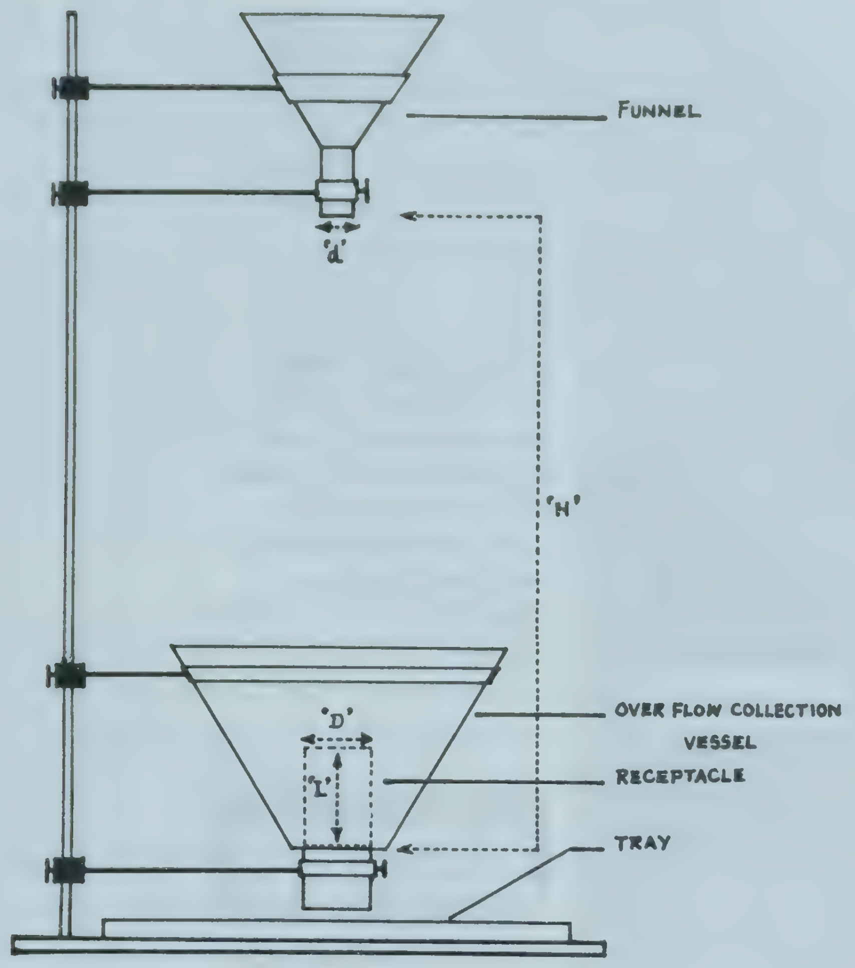
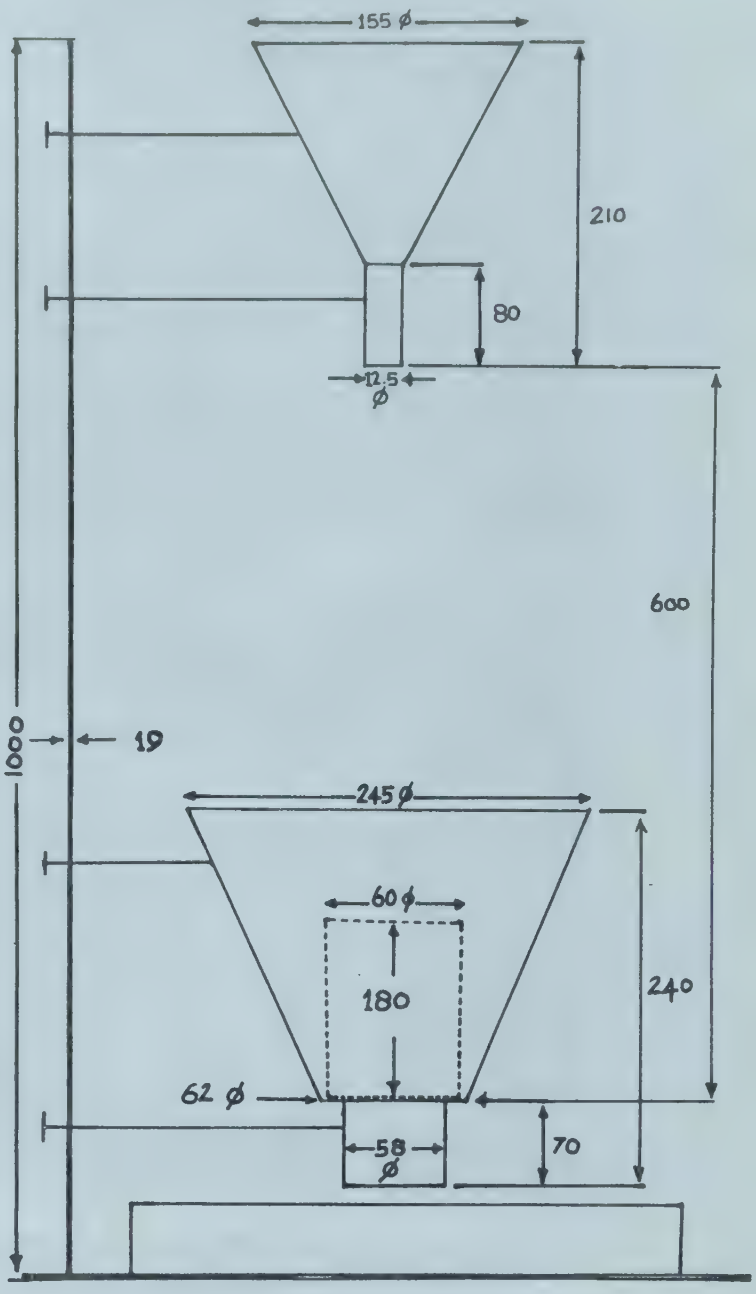

FUNNEL
'd'
'H'
'D'
'L'
OVER FLOW COLLECTION VESSEL
RECEPTACLE
TRAY

Fig. 1 : Schematic diagram of bulk density apparatus


155 ø
210
80
12.5 ø
600
1000
19
245 ø
60 ø
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240
62 ø
58 ø
70

Fig. 2 : Bulk density apparatus - measurements
(all measurements in millimeters)

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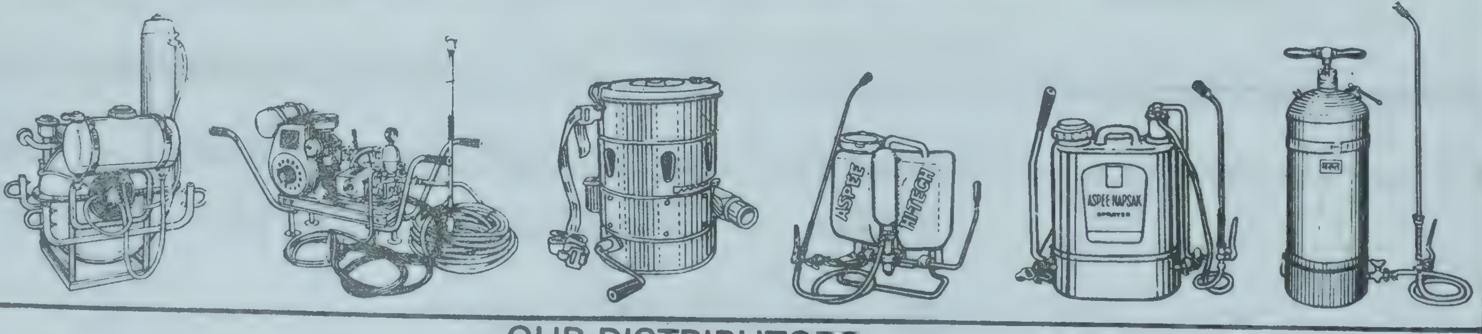

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TALES OF TEA

On one wall of my parent's living room, hangs a painting by a famous South Indian landscape artist. Down a country road file a row of bullock carts, the turbanned carters chivvying their animals on. The sunlight falls slantwise on the boles of enormous banyan trees that line the road. Dust rises in the air. It's a painting that I've always loved because of the memories it evokes of my childhood.

Every long holiday, my parents would make the long drive from the tea planting district in the hills to my school in the plains to fetch me home. Most of the route lay through thickly populated small South Indian towns-Udumalpet, Palani, Cumbum — but towards the end of the journey, the road after running through giant stands of banyan and tamarind (the scene of the painting) would abruptly begin to climb the kumili ghat, with its breathtaking views and maniacal bus drivers. And, at the end of that road would be the misty, rain-drenched hills where the tea grew in row upon row of glistening green.

My father, Eddie Davidar, turned 70 this week. He retired from the estates over fifteen years ago. Since then, the general malaise that has stuck at every aspect of this country has overcome the tea industry as well, or so we here. I'm not talking of profitability or contribution to the national exchequer both of which are apparently quite handsome. No, what I'm talking of is the vanishing of an entire way of life. Planters in times past had a touch of the exotic about them and were renowned for their lifestyles, expansiveness and ability to work and play hard. This was natural, I reckon, given the inhospitable places they harnessed to the needs of tea, and the lonely tough lives the pioneering planters led. By the time the country attained independence conditions were much better and the planters lived and played like princelings. Not for long, however, for the new masters were more interested in the bottom line rather than preserving a way of life. In this I suppose they couldn't really be faulted, for a business is a business, but what it ensured was that planting, for the most part lost its mystique and the sort of people who began to choose planting as a profession could equally well have been accountants, bankers or municipal engineers.

In "Above the Heron's pool" by Heater Lovett & Peter de Jong, published by BACSA out of London, we are given a glimpse of planting as it used to be in South India, especially in Peermade and Vandiperiyar, parts of the erstwhile Travancore state.

The primary author, Heather Lovett, a friend of the family, sadly did not live to finish the work, though Peter de Jong has completed the book very competently. Heather, her husband John and their daughters Denise and Diana, were an institution in the Kerala planting district where John was a planter with the Travancore Tea Estates Co. She has used her long familiarity with the region to give us a book that everyone who was in any way connected with that part of the world will enjoy, especially as little material has appeared in print about the subject.

The Peermade and Vandiperiyar tea district had its origins in 1847, when Reverend Henry Baker Jr of the Church Missionary Society, "Seeking a head-quarters for his new Hill Mission in Travancore, picked out a glade in the jungle, beside a stream and below a steep

PEST MANAGEMENT IN TEA

N. MURALEEDHARAN

1991. 130 pages, 18 colour plates. Hard bound. Price. India Rs. 200/- Rest of world U.S. $ 50.00 A comprehensive volume on the pests of tea in south India and their control. The book is specially designed to help executives and field officers of tea estates. The volume would be of interest to extension workers, students and teachers of Agriculture/Horticulture as well as to scientists engaged in entomological research.

Contents : 1. Introduction, 2. Concepts in pest management, 3. Pests of the tea plant — mites, 4. Insect pests — plant bugs, 5. Thrips, 6. Caterpillars, 7. Beetles and Weevils, 8. Other insect pests, 9. Non arthropod pests — Nematodes and Rodents, 10. Pesticides and their application.

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scrap of the Western Ghats, about 30 miles east of Kottayam. He named it Mundakayam, or Heron's pool".

Successive generations of the Baker family and other pioneering planting families like the Munros (Col. John Munro was Resident at Quilon from 1810 to 1819 and his son Urban Vigors Munro was Conservator of Forests) and the Kohlhoffs began settling in the jungles of Periyar and the grasslands of Peermade. Their agricultural product of choice was tea, although coffee and rubber had hitherto been the plantation crops of the area. It was a bold choice, given the fluctuations in the tea market in London, the excessive taxes imposed by the British government on the finished product, the dominance of China in the tea trade and the wretched conditions the first planters had to live and work in. Workers were scarce, and if available often succumbed to malaria or a host of other illnesses. The planters often in little shacks, more or less cut off from the world. They were often solitary for not many women would venture into the inhospitable area, though those who did make their home there, proved to be the equal of the men. Ethel Richardson and Henrietta her mother are good examples of women who ran tea estates with the same competence as their male counterparts.

In their leisure hours, the early planters amused themselves with tennis parties, picnics and shooting expeditions. There were no recreational clubs as there are now, and the prospect of an outing, especially if there were women present, was apparently the cause for much anticipation.

Things got better by the early twentieth century. Coffee was on the decline and by 1904 India replaced China as the world's largest exporter of tea. Soon, malaria and other endemic diseases were brought under control through the use of pesticides like DDT, the labour situation stabilised and tea prices improved in the London auction markets. New companies were formed and began to flourish, among them the company my Dad was associated with for over two decades the South India Tea Estates Co. Ltd. formed in 1897 and flourishing by 1915.

The fortunes of the tea industry waxed and waned in the decades to follow, but it was now an established industry and one that would endure. Some planters grew exceedingly wealthy, others muddled through, the unlucky ones were left penurious but tea was here to stay.

The story of its coming of age is the stuff of sagas but for that we'll have to wait for another book. Above all the "Heron's Poll" gives us a concise, admirably researched account of the beginnings of the tea industry in South India, a basic foundation on which I hope many other accounts will be constructed in time. **— The Hindu**

— DAVID DAVIDAR

PESTICIDES AND PEST CONTROL IN TEA

The book under review deals with the environmental impact of pesticides and the avenues for non-chemical strategies for controlling tea pests. The authors have enumerated the well known health hazards caused by pesticides and the symptoms of pesticide poisoning. The Maximum Residue Limits of a number of pesticides on tea, stipulated by different countries and international agencies are given in this booklet. However, a major omission is the MRLs proposed by the Commission of European Economic Communities for different pesticides on tea. This directive of the EC Commission is very important since European countries are the major importers of our teas. The last two chapters deal with the non-chemical methods of pest control and integrated pest management.

This is a timely publication and will help the planters to understand the usefulness of IPM in tea.

— N. MURALEEDHARAN

Environmental Impact of pesticides and alternatives to pest control in tea (*Camellia sinensis* **(L)** pp 30. Published by Assam Review Publishing Co., 29, Waterloo Street, Calcutta - 700 069.

SPRAY COMPATIBILITY CHART FOR TEA

A colour wall chart on the compatibility of the pesticides commonly used on tea has just been published by the UPASI Tea Research Institute. For copies please contact the nearest Tea Advisory Centre of UPASI. Price Rs. 25/- per copy (Inclusive of postage).

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LETTERS TO EDITOR

PROPAGATION OF MEDICINAL TREES

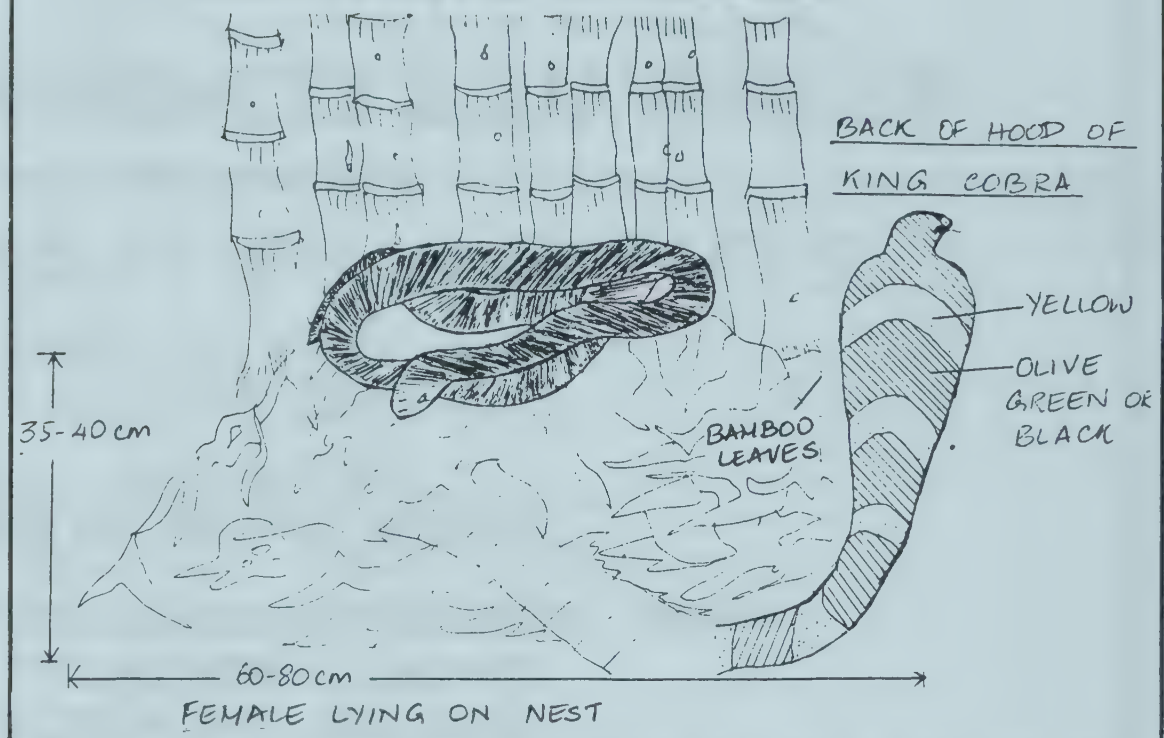
Nagarjuna Research Foundation (NRF) of which Dr. M.S. Valiathan is the Chairman, has embarked upon an ambitious programme of medicinal tree planting with the active involvement of institutions, individuals and movements in public, private, joint and co-operative sectors in Kerala with a view to saving these precious heritages from extinction. The foundation which is sponsored by Nagarjuna Herbal Concentrates Ltd. (NHCL) was constituted with multipurpose objectives like preserving the originality of Ayurveda by resorting to such measures as it deems fit and appropriate.

Though efforts are underway to propagate medicinal herbs and bushes, no serious attempt appears to have been made to take up widespread cultivation of medicinal trees which are facing eradication at the onslaught of cash crops. Now that Ayurveda is being revived with all its glory, it is important that quality raw materials for preparing complex formulations conforming to specific standards are also freely made available. Medicinal tree crops are one such source to ensure uninterrupted supply of raw materials for preparing Ayurvedic medicines.

Nagarjuna has taken up this laudable venture of massive medicinal tree planting as its social objective as one of the leading players in the field of Ayurveda in the State of Kerala. It is also in the process of setting up a full-fledged Research and Development wing attached to its factory at Thodupuzha. The programme of NRF includes exploratory attempts to blend the beneficial aspects of various systems of medicine and channelise them for the welfare of humanity. NRF also intends to have a publication cell with a view to bringing out ancient treasures in Ayurvedic literature, which are mostly out of print. Production of a journal to disseminate relevant information and technology related to Ayurveda among the prospective consumers and users is also contemplated by the Foundation.

Conducting seminars, workshops and symposia on medical topics of social significance and relevance is also included in the objectives of NRF.

KING COBRAS



We are conducting a survey and study of the King Cobra in South India. King cobras prefer high rainfall areas and many are seen in and around coffee, tea, cardamom and rubber plantations. The king cobra is the only snake that builds a nest. In April or May the female will form a pile of leaves (often bamboo) into which she lays 15-30 eggs and will then lay coiled on top of the nest for over two months (without feeding) till the eggs hatch.

We would like to hear from anyone who has any information about king cobras, especially about nests. In return, we would be happy to help with any information on snakes or snakebite.

ROMULUS WHITAKER
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Letters to Editor

The Foundation aims at planting around 5.00 lakh seedlings of selected medicinal trees in Kerala in the next 5 years. In Kerala, practically no fresh land is available for cultivating any type of crops because of the prevalence of intensive farming systems, leave alone medicinal trees. Therefore, the Foundation envisages to make use of the vacant premises, however small they are in extent, in public places like universities, colleges, schools, temples, churches, mosques, Research Institutions, public and private establishments, industrial undertakings, social service organisations, voluntary associations etc. and cover an effective area of about 1000 hectares. The foundation will make available the seedlings required for this, free of cost as far as possible and will not stake any claim on the plants so raised or their produce. Nagarjuna has no interests other than restoring the already declining population of precious medicinal trees and creating an awareness within the society on the imperative need to preserve such treasures. This is a badly felt need and that is why Nagarjuna chose to undertake this laudable cause as its prime social obligation.

Though there is an actual shortage of planting materials of medicinal trees, Nagarjuna has mustered what little is available by now and decided to distribute the same as widely as possible to the type of institutions listed above. Being the initial year of propagation, preference will be given to institutions that individuals. Those institutions interested to plant medicinal trees may please write expressing their willingness to associate with this noval venture.

P.K. NARAYANAN
Executive Director
(Development)

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Tecator AB, Sweden, have recently brought out a complete range of portable Moisture Analysers to make moisture determination fast, accurate and reproducible. The instant Moisture analyser Model 6060 / 6080 determines moisture content in flowable solids like coffee, tea, pepper, cardamom, etc., within six seconds for a sample. No pre-weighing is involved.

In India, the Tecator Moisture Meters Model 6060 / 6080, have been supplied to many leading Coffee curers and Government Organisations like Spices Board. Results have also been verified at Coffee Board and CFTRI labs.

For further information, please contact : **Tecator, 296, 5th Main, 8th Cross, S.T. Bed Layout, Koramangala, Bangalore - 560 034, Fax No. : 080-6648476.**

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UPDATE

UPASI UPDATE

UPDATE

(COVERING DEVELOPMENTS DURING JULY 1995)

COMMITTEE MEETINGS

- Labour Liaison Committee : Coimbatore : 7 July
- Trustees : Coimbatore : 7 July
- Executive Committee : Coimbatore: 7 July
- Trustees : Bangalore : 10 July
- Executive Committee : Bangalore : 25 July.

UPASI ANNUAL CONFERENCE

The 102nd UPASI Annual Conference will be held in Coonoor on 11-12 September 1995. The main conference on the 12th forenoon will be inaugurated by Mr. P. Chidambaram, Union Minister of State for Commerce. This will be preceded by Research Sessions on tea, coffee, rubber and spices on the forenoon of 11th September followed by presentation by Commodity Board Chairmen on the afternoon of 11th. The Annual General Meeting (Business Session) of the Association is proposed to be held on the afternoon on 12th September. Members are being informed separately of the details.

TEA SHIPMENTS

As reported, the requirement of obtaining from the Tea Board a shipment licence for every consignment has been dispensed with. With a view to enabling the Board to compile statistical information on exports, the Government has decided that the registered exporters of tea should submit to the Tea Board a copy of the shipping bill containing details of each shipment of tea effected by them. Exporters from South are required to send copies of the shipping bill to the Joint Controller of Licensing, Tea Board, Indira Gandhi Road, Willingdon Island, Kochi - 682 003.

JOINT VENTURE WITH VIETNAM

The Tea Board has informed that arising from the meeting of the India-Vietnam Joint Working Group on the request of the Vietnamese side for supply of tea processing machinery, it was agreed that India would supply high quality tea processing machinery on a commercial basis. It was also agreed that both sides would endeavour to promote joint ventures between Indian and Vietnamese Companies for development and management of tea plantation and modernisation of tea production in Vietnam and export to third countries. In this connection, the Indian side agreed to encourage Major tea plantation Indian Companies to participate in this activity.

SEMINAR ON TEA FINANCING

A Seminar on Unorganised Tea Sector development and financing was conducted by UPASI on 3rd July 1995. It was inaugurated by Mr. Vivek Harinarayan, Chief Regional Executive, Tea Board, Coonoor. Mr. T. Rangaiah, President, Nilgiri Small Tea Growers' Association played an active role in organising it.

Small Tea Growers and representatives of Bought leaf manufacturers attended the Seminar. Mr. A. Roy Chaudhri, Sr. Asst. Director of Tea Board, explained the various Tea Board schemes. Role of UPASI Krishi Vigyan Kendra in small grower development was spelt out by Dr. V.G. Dhanakumar, Principal and Chief Training Organiser and role of UPASI Advisory Centre by Mr. C.P. Devasahayam Joseph, Sr. Advisory Officer. Dr. N. Sathyanarayana of UPASI-TRI talked about nursery grafting and biclonal seed.

Representatives from NABARD, State Bank of India, Canara Bank, State Bank of Travancore, Nilgiri District Central Co-operative Bank and Vijaya Bank had an interactive session with the small growers and manufacturers and clarified the various financing facilities available to growers/ manufacturers of tea.

COFFEE FSQ

As members are aware, growers holding more than 10 hectares, are required to surrender 30 per cent of the crop to the Coffee Board pool. When UPASI President had occasion to meet Mr. P. Chidambaram, Union Commerce Minister in Delhi, the Minister expressed concern that the larger sector did not appear to be following the mandate to surrender 30 per cent of the crop to the pool. The Minister sought the assistance of UPASI in advising the members suitably. The President has already appealed to the large growers to rise to the occasion and pool 30 per cent of the crop with the Board as required.

PAYMENT TO GROWERS

The Coffee Board has lowered the initial payment to growers for the 1994-95 season from Rs 45 per point announced earlier to Rs 30 per point. The Board's contention is that this has been necessitated by the fall in international prices of coffee.

RUBBER REPRESENTATION

A delegation consisting of UPASI, APK & Growers Organisations called on Mr. A.K. Antony, Chief Minister of Kerala and Mr. P.P. Thangachan, Agriculture Minister, Government of Kerala at Trivandrum on 10th July 1995. The delegation apprised the Minister of the emerging NR scenario in the country and conveyed its apprehensions that unbridlled import of NR into the country will lead to a crash in prices affecting the livelihood of over 8 lakh small growers. Concern was also expressed at imports being allowed at Nil rate of duty. It was brought to the notice of the Minister that the peak production season would start by September when imports also would start coming in bulk which will lead to a sudden surplus situation and sharp fall in prices. This would, no doubt, cause undue hardship to the growers. The issues have also been taken up with the Rubber Monitoring Group of the Commerce Ministry which is scheduled to meet soon.

INDIAN INSTITUTE OF SPICES RESEARCH

The National Research Centre for Spices, Calicut has been upgraded into a full fledged Institute namely Indian Institute of Spices Research. The upgradation takes into effect from 1st July 1995.

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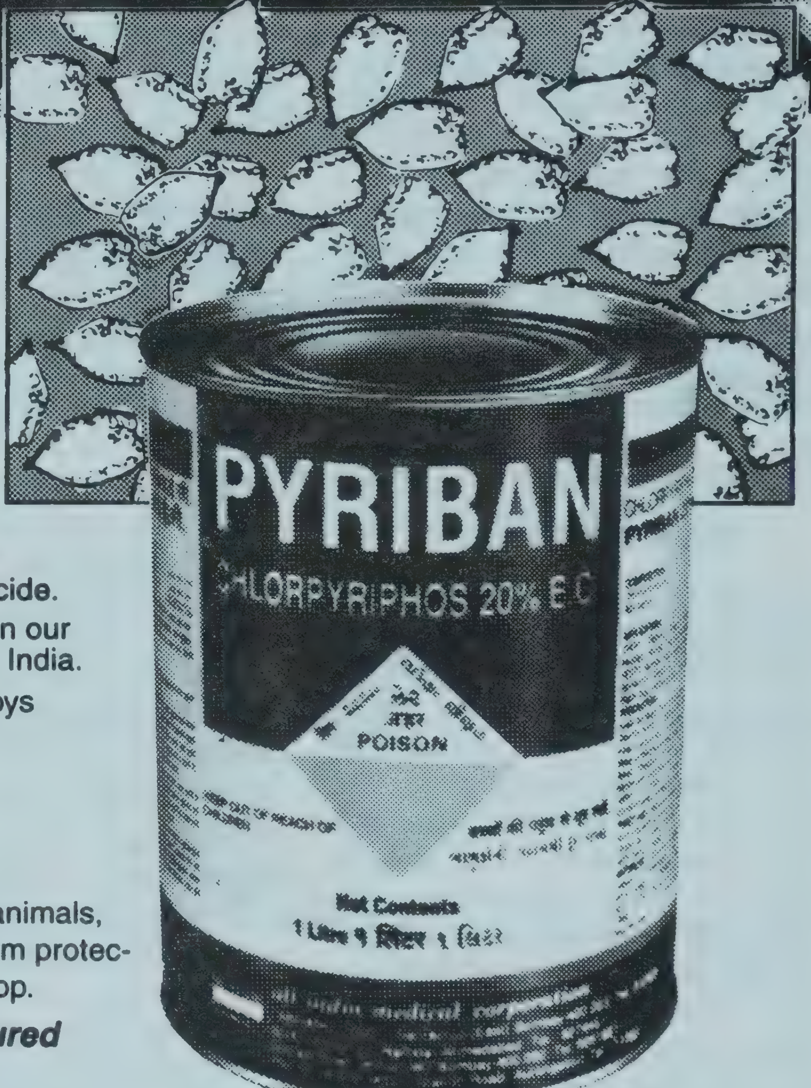

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KANYAKUMARI RUBBER WAGES

In Kanyakumari rubber plantations, a 4½ year period wage settlement was signed on 30th June 1995 covering from 1st July 1993 to 31st December 1997. Under the settlement, the revised wage of an adult worker as on July 1993 was Rs 44.70/day and as on July 1995, the wage stood at Rs 52.35/day.

BONUS ORDINANCE

The President of India promulgated an Ordinance on 9th July 1995 amending the Payment of Bonus Act, 1965 with retrospective effect from 1st April 1993, whereby the salary levels for purposes of coverage under the Act has been raised from Rs 2500/- to Rs 3500/- p.m. and for the purpose of computation of bonus from Rs 1600/- to Rs 2500/- p.m. The retrospective operation of the Ordinance, covering the accounting year 1993-94 and part of the accounting year 1992-93 falling after 31.3.1993, in the normal course, would have resulted in reopening of the bonus payments already effected in respect of these accounting years to take into account the newly eligible employees which, in turn, in many cases, would have resulted in a reduction in the rate of bonus paid to the employees under the unamended provisions necessitating recovery of excess bonus. To obviate this situation, the Executive Committee decided that bonus to the newly eligible employees could be paid at the same rate as paid for 1993-94 and pro rata for 1992-93. Members were accordingly advised to implement the Ordinance in these lines. Suitable representation has also been sent to Government to make a provision in the amending Act replacing the Ordinance to enable deduction of the additional bonus paid pursuant to the Ordinance from the Alocable Surplus for the accounting year 1994-95 or deduction from set on/addition to set off, as the case may be.

MATERNITY BENEFIT BILL

A representation has been sent to Government to make certain changes in the provisions of the Bill such as restrict the six months' leave with benefit after medical termination of pregnancy to 50 per cent of the wages, to reduce the leave days with benefit after tubectomy operation to ten days with 50 per cent of wages and to delete the proposed provision of one month's leave for illness arising out of MTP and tubectomy. A plea has also been made that the benefit under the Maternity Benefit Act may be restricted to two child births.

102nd UPASI CONFERENCE PROGRAMME SEPTEMBER 1995

5 - 9 Tues - Sat		SPORTS WEEK
11 Mon :	8.30 am	Executive Committee Meeting
	9.00 am	Opening of UPASI Industrial Exhibition
	10.00 am - 1.00 pm	Research Sessions on Tea, Coffee, Rubber and Spices
	2.30 pm - 5.00 pm	Session n "Prospects & Problems of Plantation Sector in the Changed Economic Scenario" by Chairman, Commodity Boards
12 Tues	9.30 am	—TEA—
	10.30 am	Inauguration of 102nd Annual Conference by Mr. P. Chidambaram, Union Minister of State for Commerce
	11.45 pm	Talk by Guest Speaker
	3.00 pm	102nd AGM (Business Session)
		AGM of Benevolent Association
		Meeting of newly elected Executive Committee

P.F. MATTERS

a) Consequent to the upholding of the validity of the 1990 amendment, deleting the qualifying service for enrolment to the Provident Fund, by the Supreme Court in a case arising from the Madhya Pradesh High Court, the Central Provident Fund Commissioner has reportedly given instructions to the Regional Commissioners to implement the amended provision with effect from 1st May 1995.

b) The Government of India, Ministry of Labour, has revised the pattern of investment of Provident Fund moneys of exempted establishments with effect from 1st April 1995, under which, 25 per cent has to be invested in Central Government securities, 15 per cent in State Government securities or other negotiable securities guaranteed by the Central/State Governments, 30 per cent in Special Deposit Scheme and 30 per cent in Special Deposit Scheme and 30 per cent in bonds/securities of 'public financial institutions' or certificiates of deposits issued by public sector banks.

c) The Government of India, Ministry of Labour, has issued another notification declaring 12 per cent as the rate of interest to be credited to the accounts of P.F. subscribers for 1995-96. It may be noted that this is the seventh year in succession Government is declaring 12 per cent as the interest.

PERSONALIA

Mr. K.B. Pillai, IAS, Chairman of the Marine Products Export Development Authority assumed additional charge as Chairman, Spices Board on 7th July 1995.

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திருமண்டங்குடி
NETT WEIGHT 25 Kg
WHEN PACKED

Contains :

*	Nitrogen (N)	3.73%
*	Phosphorus (P_2O_5)	3.64%
*	Potash (K_2O)	2.36%
*	Carbon (C)	17.70%
*	C/N Ratio	4.80%
*	Calcium (Ca)	5.07%
*	Sulphate (S)	1.29%
*	Iron (Fe)	1.48%
*	Copper (Cu)	0.21%
*	Magnesium (Mgs)	0.61%
*	Organic Matter	44.50%

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COCHIN	37.25	43.13	40.91	39.61	30.55	25.00
COIMBATORE	36.65	42.93	38.56	43.86	25.60	25.42
COONOOR	37.08	35.01	38.32	35.97	23.70	25.44
AVERAGE	37.09	40.95	39.57	39.87	26.84	25.19

CROPS	LATEST	6 MONTHS AGO	YEAR AGO
COFFEE			
Private Auction			
PLANTATION A	86.36	124.10	145.25
ARA. CHY. AB	77.06	99.92	136.20
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a) **Kottayam**			
RSS LOT	43.00	38.50	30.25
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1995	:	19,176
1994	:	14,597
1993	:	18,260
JANUARY to JUNE		
1995	:	89,805
1994	:	99,544
1993	:	84,216

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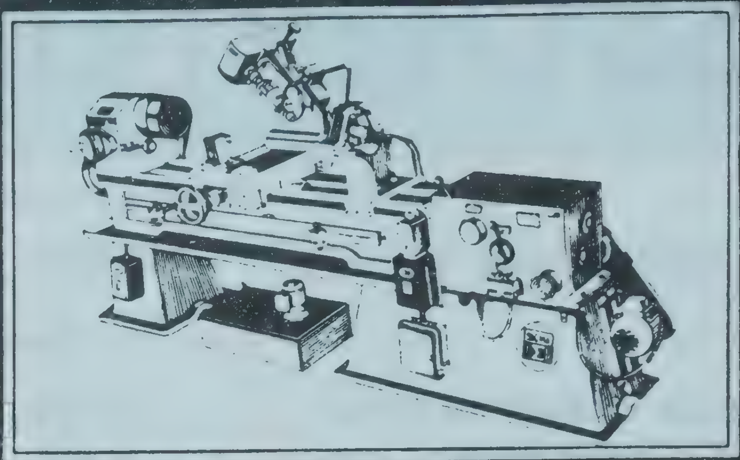

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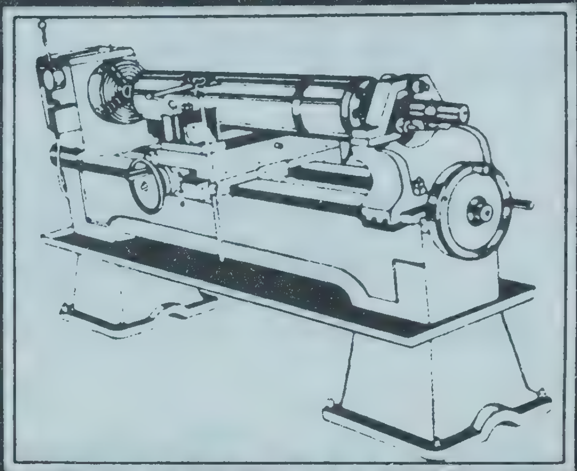

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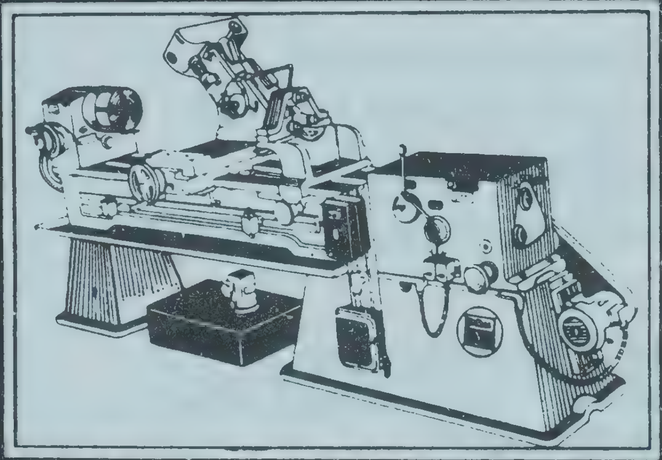

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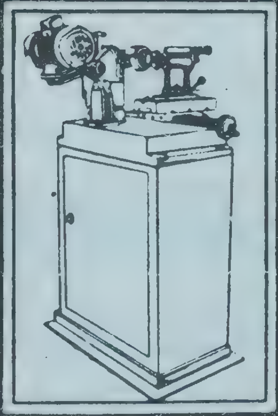

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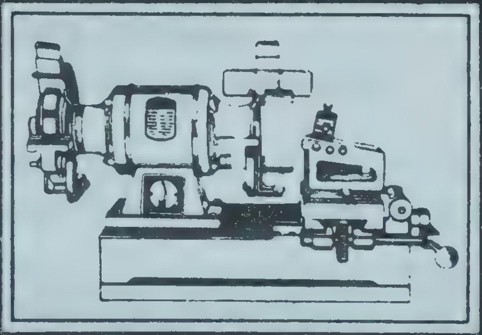

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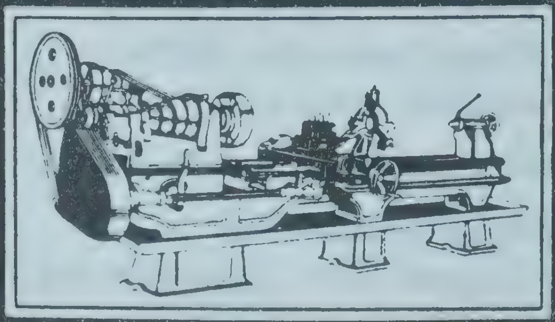

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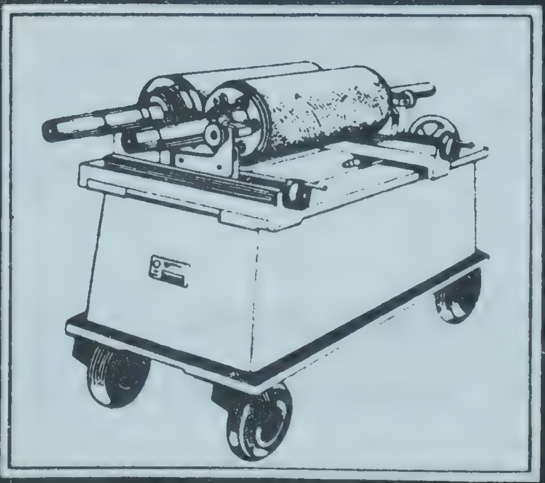

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ATTITUDINAL CHANGES CALLED FOR AMONG PLANTERS AND SCIENTISTS

"What is new"? — many planters when they meet the scientists of Tea Research Institute (TRI) pose this question — partly as opening conversation, partly out of curiosity and partly in jest. And may be because of the widely prevalent inadequate appreciation of the link and time factor of research and end-result.

The fact is that many planters have little or no clue of what the scientists in TRI are doing. And hardly they bother to find out.

On the other side, scientists in TRI, as the scientists all over the world, lament at 'commercial' people not appreciating or understanding the vital role of research.

"When the per hectare yield or tea has gone up from 2500 kgs to 3000 kgs in an estate, largely due to research and advisory work, all they contribute for TRI is just the price of 2 kg of tea. Is it too much?" This is the general refrain of TRI scientists.

"Look at the output from research", justifies the scientists.

"Positive outcome is what we want and not tonnes of paper detailing research work" retorts the planter.

Talking *at* each other, not *to* each other.

Has not the time come for a change in approach on both sides?

- Research has to have more slant towards backing, commercial application.
- Research must strive to pay for itself.
- Shift emphasis from producing papers to solving problems at the field level.
- Appreciate the fact that scientific application has to be tempered by economic/ commercial viability.
- Reach out instead of taking the approach of 'we are available'.

That TRI has done yeomen service to South Indian Industry is an acknowledged fact. Productivity growth in the South is the most visible certificate, TRI has dedicated scientists and sophisticated equipments. Hence what is required is the change in approach by TRI.

Planters contact-point generally is the Advisory Officer. And once a while with the scientists of TRI. There are exceptions. Aware of the fund of knowledge painstakingly built by research by scientists in TRI, some planters have on-going dialogue with scientists and benefitted by the same.

However, distance and lack of interest prevent many to take advantage of the knowledge of the scientists.

Planters, particularly those in the higher echelons, must not relegate wholly the interface with TRI scientists to their junior managers. Yes, junior managers must have more interface. But seniors should also directly involve. Be it area scientific meeting or visits of Heads of Departments of TRI to estates, time should be found by senior management personnel.

It is agreed that research activity has to be under rigorous scrutiny, particularly the expenditure angle. But awaiting lightning result is to beg the issue. Research is ledious, painstaking and time consuming. Even then, often there may not be a clearcut finding. We all know it. But when we evaluate the performance of TRI, many of us tend to forget this characteristic of research.

Rewards : A pat on the back, a nice letter, a good word, a special increment, a promotion, an appreciation in a public forum; there are innumerable ways of showing appreciation and encouraging scientists. Is this asking too much? Why should planters be chary of saying a good word when a good word is deserved? Unfortunately, it is seldom done.

Advisory Officers are much in demand. They are all the time on the move in a jeep or a motorbike. Difficult terrain or incessant rains do not daunt them. They have to live at places where good facilities for education are not available. Distant hospitals, inhospitable terrain, etc are also their lot. Their work deserves appreciation.

Tea Board has given a grant of Rs. 50 lakhs for setting up sophisticated testing equipments in the Advisory Centres. Looking at the demand for testing soil in the Advisory Centres, there is no doubt that as and when these sophisticated equipments are installed, they will be fully utilised by the planters. This is good.

What more should be done by the TRI and the Advisory Officers is for planters to tell.

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EDITOR : D. Ravindran. Printed and published by Dr. D. Padmanaban at Kalaikathir Achchagam, Coimbatore 641 037.

Opinions expressed in this journal are not necessarily those of the UPASI.

UPASI TEA SCIENTIFIC DEPARTMENT — A HISTORY OF ACHIEVEMENTS —

The UPASI Tea Scientific Department will be soon completing 70 years of service to the tea industry of South India. The modest Tea Experimental Station in Davershola, started in 1926 has grown into a fullfledged Tea Research Institute at Valparai. Facilities for research have improved considerably during the last 20 years. Several projects funded by Tea Board, National Tea Research Foundation and Department of Biotechnology are also in progress at the TRI.

During the last seven decades, the Scientific Department has made significant achievements in the different spheres of research and contributed to the growth and productivity of the tea industry. The efficient network of Advisory Centres has also been successful in transferring the technology to the tea planters.

Some of the major achievements of the Scientific Department are listed below :

1. Release of 27 clones, five biclonal seed stocks and recommendations on six clonal combinations for nursery grafting.
2. Refinement of nursery practices for propagation through clonal cuttings, grafts and biclonal seeds.
3. Standardisation of plant density, style of planting and bringing young tea plants into bearing.
4. Substitution of harder forms of pruning by cut across in young and mature tea.
5. Two stage tipping in young and rejuvenated tea fields. 'Jat specific' and 'pruning height specific' recommendation on tipping in pruned tea.
6. Optimisation of plucking interval, based on leaf expansion time (LET) for hand plucking and shear harvesting.
7. Development of integrated schedule for shear harvesting in the high cropping months and hand plucking during the intervening period.
8. Multidimensional schedules for weed management.
9. Alleviation of drought stress in young plants by topical application of kaolin.
10. Foliar application of NK mixture on mature tea to combat drought.
11. Development of protocol for micropropagation of tea through tissue culture.
12. Development of a basis for determining anticipated yield (based on yield of previous pruning cycle) for the estimation of N rate.
13. The nitrogen-potassium ratios have been determined for young and mature tea.
14. Recommendation on the rate of P application on the basis of available soil phosphorus and yield level.
15. Precise rate of N has been worked out for various yield levels and organic matter status of soil.
16. Recommendation on foliar application of magnesium.
17. Evolved a system of progressive auditing of nitrogen and potassium fertilisers.
18. Economic control of blister blight by integrating protectant, eradicant and systemic fungicides.

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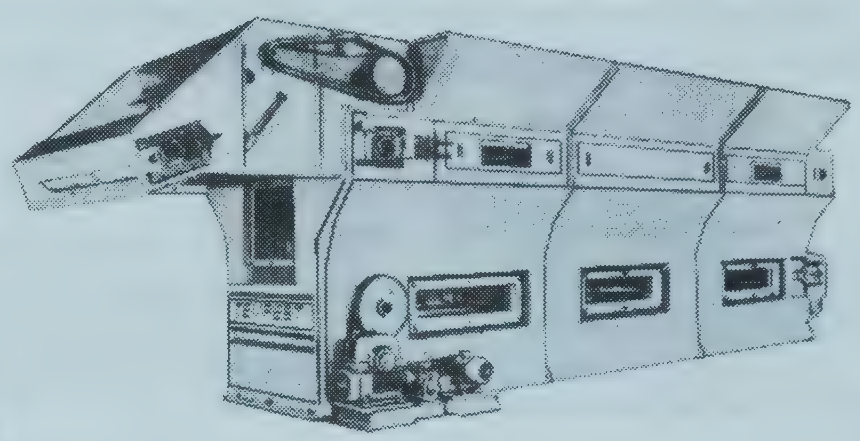

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Research Priorities

19. Improved the protectant action of copper fungicides by the addition of low concentration of antibiotics on tea recovering from pruning.
20. Introduction of formulations with low nickel chloride content in combination with copper for improved blister control.
21. Addition of nonionic wetting agents for improving efficiency of copper + nickel combination.
22. Identification of triazole fungicides for blister control.
23. Recommendation of foliar application of zinc sulphate along with manganese and boron.
24. Control of root knot nematodes in nurseries.
25. Recommendations on chemical control of pests.
26. Integrated management of shot hole borer involving damage assessment, post prune and midcycle insecticide application and use of potassium fertilisers.
27. Information on biocontrol agents of tea pests.
28. Use of neem formulations for the control of mite and caterpillar pests.
29. Development of split CTC process to increase theaflavin and other colour constituents present in tea.
30. Identification of alternate packaging materials.
31. Development of prototype UV fermentation machine to improve black tea quality.
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ADVANCES IN TEA PEST MANAGEMENT

N. MURALEEDHARAN *

It is necessary to highlight the magnitude of crop and plant losses in tea plantations due to pests for an appreciation of the importance of pest management programme. There have been several attempts to study the crop loss caused by pests in Southern India. The tea mosquito bug could cause a crop loss of 11 - 100 per cent during the pest season. Earlier investigations had shown that 8 - 17 per cent increase in crop could be obtained following efficient mite control. However, a recent study conducted in the Anamallais indicated that the loss due to pink and purple mites would be only around 5 per cent. Infestation by thrips can lead to enormous crop loss and severe debilitation of bushes resulting in complete cessation of crop over several weeks or even months. It has now been proved that shot-hole borer can cause about 7 per cent loss in crop when 20 per cent of the bushes are infested.

In addition to direct crop loss, pest damage can adversely affect the quality of processed tea. Black tea, manufactured from thrips attacked leaves, suffered from a general deterioration in the quality. Feeding by flushworms results in the lowering of extractable solids and an increase in crude fibre content. Liquors made from such leaves have been rated as 'flat'.

Tea plants are subjected to the attack of nematodes, mites and insects. Vegetatively propagated clonal plants and seedlings are equally susceptible to the attack of root knot nematodes but the latter suffer more. Plant parasitic nematodes could wipe out large sections of nurseries. Moreover, the eelworm affected plants, when put out in the fields, will have poor growth and ultimately die, creating the serious problem of replanting.

The root knot nematode of mature tea, is reported only from Sri Lanka and Southern India. In this part of the country, this nematode was reported only from Gudalur taluk (Nilgiri - Wynad) and its presence was suspected in Wynad. Recently, we came across an instance of mature tea being affected by eelworms in Coonoor. These infested plants have slow recovery after pruning and many of them may even fail to recover. Seedlings grown in infested soils, develop galls very slowly and such plants are not severely affected. Fortunately, the occurrence of this nematode is confined to a few pockets, with no remarkable tendency to spread.

Mites are serious pests of tea and in Southern India. Pink and purple mite are the species regularly occuring on tea. These mites have a short developmental period. The pink mites mostly frequent the tender foliage on the top 10-15 cm of bushes whereas the population density of purple mites is highest on the maintenance leaves at the middle level of bushes. Unlike pink and purple mites, the scarlet mite has a longer developmental period of 30-36 days. The life history and seasonal trends of scarlet mites in Southern India have been studied in detail. The red spider mite normally infest the upper surface of mature leaves though in extreme cases they invade the lower surface of young leaves. The yellow mite was not recorded as a pest of tea till 1955, but since then, the species is noticed here and is occassionally reported to cause severe damage, though in isolated patches.

Before the introduction of DDT, the tea mosquito bug was considered the most serious pest of tea in Kerala, especially in the gardens of Trivandrum, Vandiperiyar and Peermade. In the past, around 40,000 acres (16,200 ha) of tea were annually subjected to the ravages of tea mosquitoes. At present the incidence of this insect is restricted to a few isolated pockets in the above mentioned places.

One of the earliest publications of UPASI is on the life history and control of tea mosquito bug by W.S. Shaw in 1928. The seasonal prevalance of the pest is largely dependent on weather factors and tea mosquito is generally considered a wet weather pest, the insect being intolerant to very dry conditions.

---

* **Dr. N. Muraleedharan joined the TRI in 1980 as Head of Entomology Division. Currently, he is the Joint Director.**

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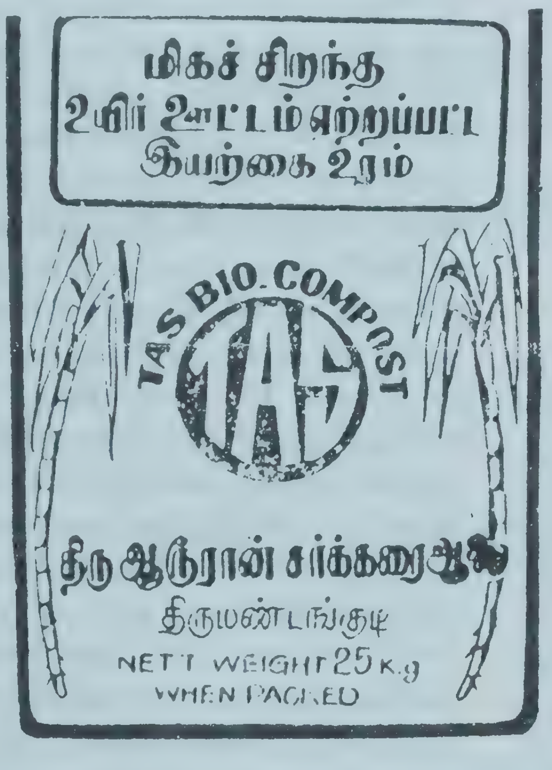

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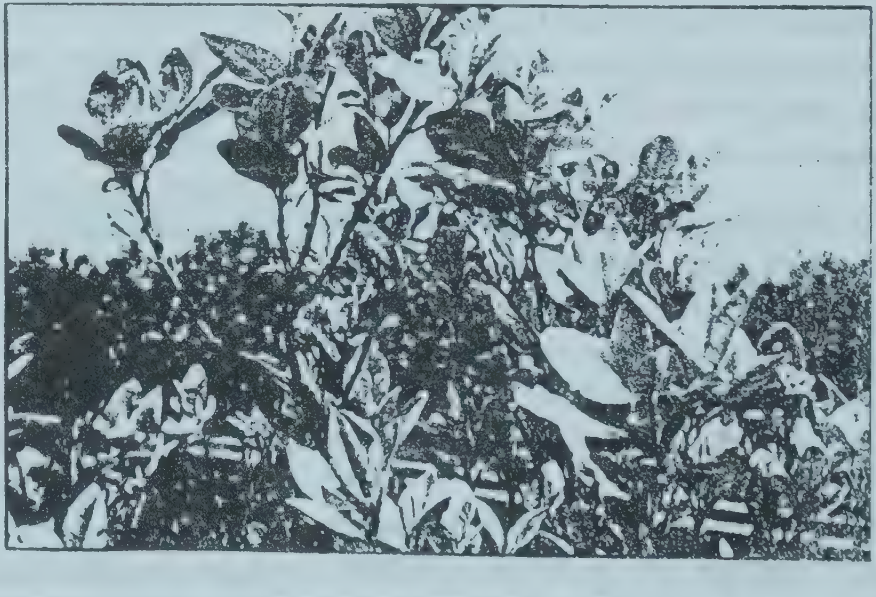
*	Phosphorus (P_2O_5)	3.64%
*	Potash (K_2O)	2.36%
*	Carbon (C)	17.70%
*	C/N Ratio	4.80%
*	Calcium (Ca)	5.07%
*	Sulphate (S)	1.29%
*	Iron (Fe)	1.48%
*	Copper (Cu)	0.21%
*	Magnesium (Mgs)	0.61%
*	Organic Matter	44.50%

TAS BIO COMPOST

- *Increase organic matter and humus content of the soil.*
- *Increases the fertiliser use efficiency.*
- *Improves soil texture and structure.*
- *Reclaims problem soil.*
- *Increases the waterholding capacity of the soil.*
- *Enhances the multiplication of beneficial soil Microbes.*



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Tea plantations suffer heavily from the attack of thrips. They prefer young leaves and buds. Incidence of thrips is more pronounced in fields recovering from pruning. The life history and seasonal trends of these thrips had been studied in South India. The life cycle is completed in 15-25 days, depending on weather conditions.

In the South, caterpillars feeding on tea occur only as minor pests though at times severe outbreaks of some of the species result in economic losses. Among the leaf folding caterpillars, the flushworm attracted the attention after its first serious out break in 1955. They are more abundant in fields recovering from pruning and attack only the young shoots. Studies have shown that in areas like Anamallais and Vandiperiyar high population density of flushworms is seen during July to November. The leaf roller, yet another minor pest is commonly seen in large numbers in fields recovering from pruning.

In addition to the above, loopers, nettle grubs, jelly grubs, bag worms, slug caterpillars, cutworms and lobster caterpillars occassionally feed on tea.

Caterpillars infesting tea stems are not very many. The red coffee borer, tunnels into the stems of young tea plants. Another stem boring caterpillar commonly called the 'phasus borer' attacks tea and also a number of forest trees. The callus tissue around the tunner mouth form the food of the larva.

Beetles and weevils affecting tea are less numerous than caterpillar pests. In Southern India, the shot-hole borer, is the most important beetle pest. Interestingly, as late as in 1956, this beetle was thought to be of minor importance in our country. They are now widely prevalent in the middle and low elevation areas such as Gudalur, Wynad, Nelliampathy, Trivandrum, Anamallais, Vandiperiyar and Peermade. However, they are almost absent from the high elevation areas of Idukki and Nilgiris districts. Female beetles construct galleries in stems, leading to branch breakage and consequent crop loss. The galleries are excavated on the primaries formed after pruning. A large part of the affected stems and beetle populations would be removed during pruning. There would be practically no new attack on the bushes on the first year of pruning cycle. Fresh infestation builds up from the end of the second year.

The galleries made by the beetle may be circular (Spiral), longitudinal (Vertical) or of a mixed type. In areas like Anamallais and Nelliampathy the galleries are mostly spiral whereas in Vandiperiyar there is a preponderance of vertical galleries. Branch breakage is more when the galleries are circular. Peaks in the populations of shot-hole borer are observed in April, July, October and December.

White groups inhabiting the soil are another group of pests, especially of young tea plants. They eat away the roots and bark, resulting in the death of plants.

Termites are not serious pests of tea in this region. However, soil nesting and mount building species of Odontotermes are seen on bushes in Wynad and Palghat.

Different cultivars of tea, having different growth habits vary in their suspectibility, resistance or tolerance to pests. There have been attempts to screen tea cultivars against certain pests. The clones UPASI-12 (B/6/129), TRI 2026, UPASI-10 (B/6/62 or Pandian) and UPASI-20 (B/7/372) have been found tolerant to the attack of shot-hole borer. Certain Srilankan selections such as TRI 2024 and TRI 2025, which are planted in Southern India as well, are susceptible to the attack of this beetle and it is imperative that the planting of these clones should be avoided in areas prone to borer attack. The clones UPASI-1 and UPASI-9 have high incidence of flushworms. Chineric varieties are more susceptible to the attack of scarlet and red spider mites whereas Assam jats are more prone to infestation by pink and purple mites. The clones UPASI-12 and UPASI-24 harbour more number of pink mites while on UPASI-10, population density of these mites is very low.

Cultural operations such as plucking, pruning, regulation of shade and use of agrochemicals influence the incidence and abundance of tea pests. Certain caterpillars like flushworms, leaf rollers and tortrix can be controlled to a certain extent by manually removing the infested shoots during plucking. Flushworms, leaf rollers and aphids are more abundant in fields in their first year of pruning cycle. A case in contrast to this is that of the shot-hold borer, the attack of which increases with the age of the field since pruning. This aspect could be one of the criteria for deciding the length of pruning cycle in the shot-hold borer affected fields.

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Intensity of shade plays a predominant role in determining the population density of thrips, aphids, tea mosquito bug and mites. Unshaded tea fields always harbour more number of thrips and mites whereas damage by tea mosquito bug is more severe in moist, heavily shaded areas. Grevillea trees are comparatively free from the attack of insect pests though they act as an alternate hosts for the red spider and scarlet mites. Dadap trees are alternate hosts for root knot nematodes. Therefore, soils from 'dadap' growing areas should be treated for nematodes before they are used in tea nurseries. It is a common practice to heat nursery soils to 60 - 62° C for killing the larvae of root knot nematodes.

Application of higher levels of pottasium fertiliser has been proved to reduce the incidence of certain pests and diseases. Pottasium fertiliser, when applied at high dose in the pruned year reduced the incidence of shot-hole borer.

The pattern of pesticide usage is another important factor influencing pest build up. The continuous use of copper fungicides against the blister blight disease was responsible for high mite build up. The continuous use of DDT and BHC for insect pest control had also probably helped the mites to develop into major pests. The widespread use of dieldrin for shot-hole borer control in 1960's led to the outbreak of several secondary pests such as nettle grubbs and looper caterpillars.

In the tea ecosystem several biocontrol agents are active, exerting a natural regulation on the populations of many pests. Recently extensive surveys were carried out in the tea growing areas of Southern India resulting in the discovery of a large number of parasitoids and predators. The pink and purple mites are attacked by the predatory mite, Amblyseius herbicolous (Chant) and the thrips, Scolothrips rhagebinus (Priesner). Several coccinellid beetles act as predators of the red spider mite. Populations of the tea aphid are controlled by a complex of predators and parasitoids.

The leaf folding caterpillars, flushworm, leaf roller and tea tortrix are attacked by many natural enemies. A braconid wasp is the principal parasitoid of flushworm in Southern India. In the Anamallais, Parasitsm by these species was as high as 17.64 per cent. A eulophid parasite exerts tremendous pressure on the populations of the leaf roller. The tea tortrix is well regulated by two parasitoids, an ichneumonid and a tachinid. Formulations of bacterial insecticide (Bacillus thuringiensis) are effective against flushworms.

The importance of chemical method of pest control in plantation crops at large and tea in particular had always been emphasised. The tea mosquito was the first pest to threaten the South Indian tea industry and extensive field investigations had resulted in the successful chemical control of this insect. A large number of organochlorine and organophosphate pesticides have been tried against mites, flushworms and thrips. Our field studies have established the effectiveness of fenvalerate, cyper methrin and deltamethrin for the midcycle control of shot-hole borer. A combination of quinalphos and dichlorvos is also effective against this pest. Granular formulations of aldicarb, carbofuran and phorate are very effecting in protecting the nursery plants from the attack of root knot nematodes. Further these granules are recommended for the control of white grubs.

Whilst more than two dozen chemicals are available for pest control in tea, the choice for widespread application is restricted to a few chemicals such as dicofol, endosulphan, phosalone and ethion which are cleared by the Environmental Protection Agency (EPA) of USA for maximum residue levels. Over the years, the expert groups of the FAO and WHO have also reported the Maximum Residue Levels (MRL) of several pesticides on tea. The Tea Research Institute has always been recommending the usage of EPA cleared chemicals. Recently, the commission of European Economic Communities has issued a new directive on the MRL of different pesticides in tea and efforts are being made to adhere to the limits prescribed by the EEC.

Insecticide and acaricide applications on tea are usually carried out soon after plucking. The pesticides applied on shoots undergo a 'growth dilution'. The weight of a bud increases during the plucking interval and this helps in bringing down the residues of pesticides on a weight by weight basis (mg/kg tea). By the time the immature buds attain the size of pluckable shoots, the residues of pesticides on them will be low.

Nearly 30-60per cent of pesticides present in the shoots are lost during the manufacturing process, mainly due to evaporation and

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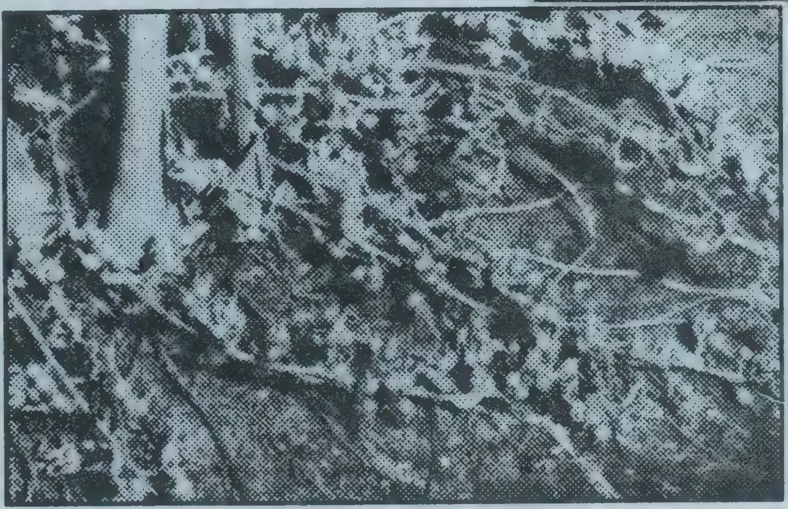

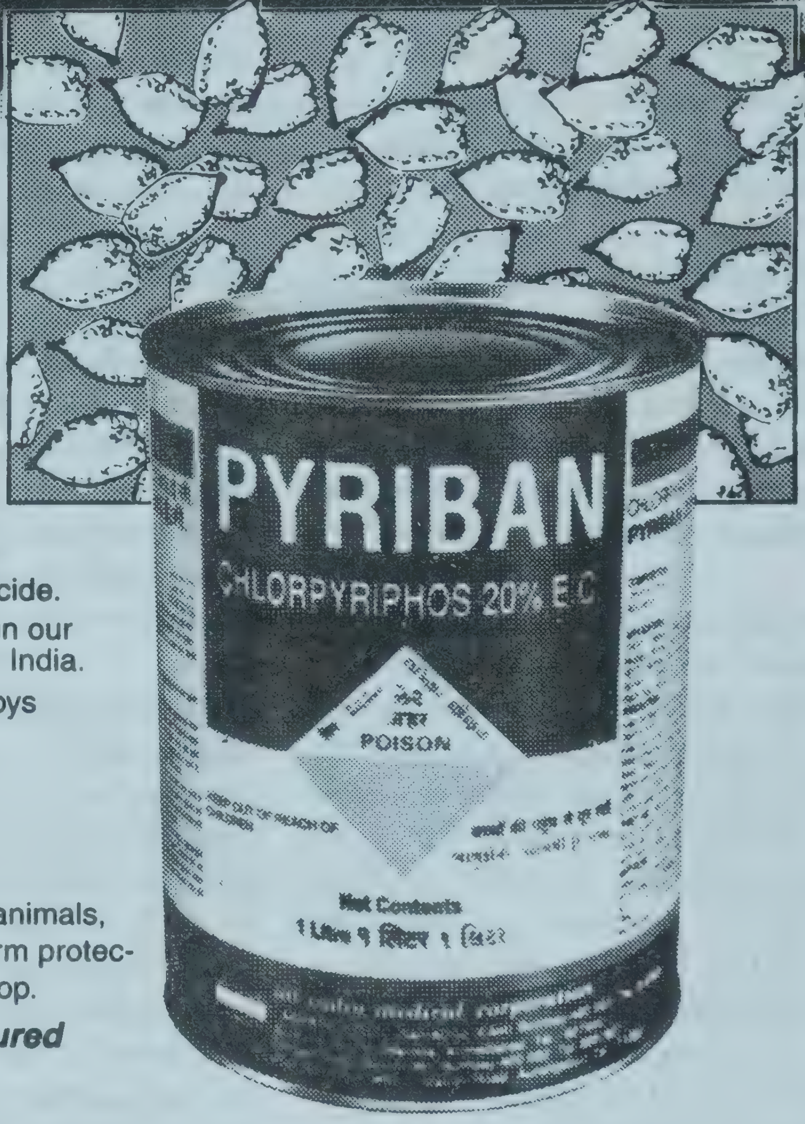

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thermal decomposition. During manufacturing, tea is dried at 100 to 150°C and at this temperature thermal decomposition of pesticides will be high. Compounds with higher vapour pressure are likely to leave lesser residues during manufacture.

Several experiments have been carried out in Southern India to determine the levels of residues of different pesticides on tea and it was found that the residues on the final product (black tea) were fairly low.

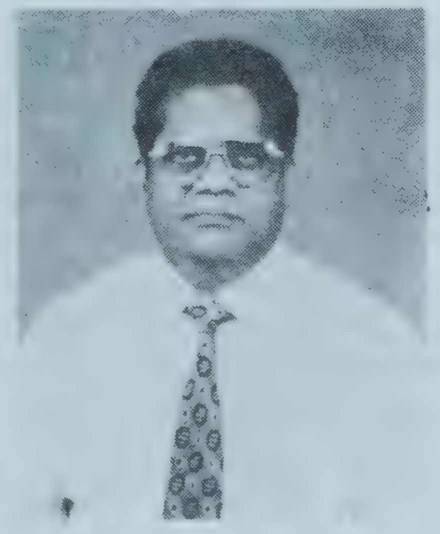
Processed tea, when infused with boiling water will extract smaller quantities of residues on the tea liquor, again due to degradation at the high temperature of boiling water. The solubility of the compounds in water also determines the level of residues in tea liquor. Pesticides with high water solubility will leave more residues in the tea liquor whereas those with low solubility will leave most of the residues in the spent tea.

Pesticide residues on tea are thus greatly reduced through a series of operations, right from plucking to manufacturing and ultimately the residues left in the tea liquor are rather low. It is indeed desirable that tea is kept completely free from pesticide residues, but in view of the pest and disease problems and the economy of tea production in Southern India, this proposition would be unrealistic. The only alternative is to keep the residues much below the MRLs fixed for the different pesticides in tea.

Formulations containing Azadirachtin, obtained from neem seed kernels have been evaluated against certain tea pests and efforts are on to integrate them in the tea pest management programme.

The perinnial nature of the crop and the more equitable weather pattern prevailing in our tea areas are favourable for the insect pests as well as their natural enemies. While data are available on the life history of many of the pest species, there is a big lacuna in our knowledge of their ecology and population dynamics. Critical crop loss appraisal and establishment of economic threshold levels, of atleast the key pests, are an urgent need. Tea plantations harbour several biological control agents. The minor status of many of the tea pests is due to the influence of these predators and parasites. The entomologists at the TRI are currently engaged in the research to evolve an integrated pest management programme for tea.

NEW DIRECTOR IN UPASI TRI



Dr. A. Abdul Kareem, former Director and Professor of Tamil Nadu Agricultural University, Coimbatore, has joined UPASI Tea Research Institute, Valparai, as Director on 17th August 1995. Dr. Abdul Kareem is an agricultural graduate with specialisation in Agricultural Entomology both in M.Sc. (Ag.) and Ph.D. courses. Dr. Abdul Kareem has served for 36 years in research, extension and teaching in various capacities as Asst. Professor, head of the Department and Director in Tamil Nadu Agricultural University. He was a Visiting Scientist at International Rice Research Institute, Manila, Philippines for about two and half years and investigaed on the pesticidal potential of neem derivatives in a scheme sponsored by Asian Development Bank, Manila, East West Centre, Hawai and International Rice Research Institute, Manila. He headed the Tamil Nadu Rice Research Institute, Aduthurai, as Director for 5 years. He served as a Research Manager for 14 research stations. In his jurisdiction he implemented, monitored and guided several research programmes on major commercial and food crops in Tamil Nadu on aspects like crop improvement, crop production and crop protection. He has published more than 250 research papers.

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RESEARCH PRIORITIES

LANDMARKS IN TEA DISEASE CONTROL

B. CHANDRA MOULI*

The Plant Pathology Division is one of the oldest divisions of the UPASI Scientific Department. It was established in 1931 with the appointment of a Mycologist for identifying fungi affecting the root, stem and foliage of tea and ancillary crops that are commonly grown in tea fields, such as, green manure and shade plants. This work continued until the dreaded blister blight invaded South Indian tea, 15 years later. Till the incursion of blister blight, disease control was never intensive and mainly aimed at controlling black rot, with the then available copper fungicides. Similarly, pockets affected by red rust were sprayed with copper fugicides to reduce the sporulation. Subsequently, the findings of the Soil Chemist, on potash deficiency as a critical factor in tea bush health had a direct bearing on the red rust, because the disease disappeared following Department's recommendations on fertilizer application, pruning and plucking. In course of time, black rot was also wiped out when regular fungicide spraying became a necessity for controlling blister blight. Injury to tender branches, caused by hail storms resulted in invasion of the wounds by a fungal pathogen *Macrophoma thecola* causing typical cankers on the stem. Similar invasion of tea recovering from pruning at high elevations by *Leptothyrium theae,* causing die-back of newly emerged branches has also been reported. Surgical removal of the diseased branches and palliative copper fungicide application were recommended for both these disease and still continue to be in vogue. Currently, none of these maladies, namely, red rust, black rot, *Macrophoma* branch canker, and *Leptothyrium* die back are of any economic significance.

Root disease control

Root diseases, incited by *Armillaria, Poria, Fomes* and *Rosellinia* caused staggering capital losses of tea in the early years of planting. They are a legacy of the jungle, and the panthogens harboured on the roots of the jungle trees became sources of infection when tea was planted after clearing the jungle. Depletion of starch reserves in the roots of jungle trees by ring barking them was one of the successful methods suggested for prevention of root diseases which was widely adopted. In situations where the diseases were already noticed in tea, methods such as trenching and isolating the diseased patches, removal of dead bushes were effective. Recognising the self-defeating nature of some of these measures, a critical appraisal of soil fumigation aimed at eradication of root pathogens in infected pockets of tea was commenced in 1959. The results that were achieved, the application of the findings on industry-wide scale in South India are a success story. Injection of chemicals like Vapam (metham sodium), and Shell D-D yielded excellent results and enabled replanting of tea within a short period. Methyl bromide, a gaseous fumigant was also found to be useful in later years.

As the availability of fumigants became difficult, it was essential to look into alternative means of root disease control. Recent laboratory studies have indicated the usefulness of certain fungal antagonists in inhibiting the growth of the root pathogens. Species of *Trichoderma* occuring naturally in tea soils were very effective in suppressing the root disease fungi and their field evaluation is in progress.

Stem diseases

In the sixties wood rot disease became a serious limiting factor to crop production. Pruning into dry weather, to protect tea bushes from serious attacks of blister blight during their vulnerable recovery period has resulted in sun scorch damage of main frame. Such defunct bushes responded poorly even to proper manure application and good husbandry practices. Fungicide applications were not effective as the causative fungus was deep seated. Drastic removal of diseased frame by rejuvenation pruning was recommended by the Pathology Division and till day this is the only solution for this problem. This operation, with judicious fertilizer application brought about healthy primary frame, gave a new lease to the productivity of the bushes. This is a major contribution by the Division to the Tea Industry. Tea gardens, which adopted this recommendation, increased their yields significantly; a subsidy is also offered by the Tea Board for this operation.

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* **Dr. B. Chandra Mouli, Senior Plant Pathologist & Head of the Division is with the TRI since 1974.**

Leaf diseases — Blister blight

Blister blight appeared in 1946 in South India. Tea industry suffered from calamitous crop losses in the first few years of the disease epidemic before control measures were fully implemented. Copper fungicides were the only ones available for protective control at that time. Though a few organic fungicides were available subsequently, they did not provide satisfactory control. Introduction of nickel chloride as a therapeutic fungicide was a breakthrough in blister blight control. Nickel chloride was effective in eradicating the disease *in situ* and a combination of protectant copper and eradicant nickel became the choice of the industry to manage the disease efficiently and economically.

Systemic fungicides ushered in a new era in blister blight control. Of the many evaluated, tridemorph, bitertanol, propiconazole and hexaconazole exhibited long residual action and permitted their application on extended rounds, thereby saving on labour considerably.

Tridemorph, possessed powerful antisporulant action and the treated blister lesions aborted with a very low spore production. This fungicide also suppressed the build up of mite pests in the ensuing dry season. An integrated schedule with tridemorph and copper-nickel fungicides was recommended to tea industry for achieving good disease control.

Recent introduction of triazole based organic fungicides, namely bitertanol, hexaconazole and propiconazole, in combination with protectant copper offered good disease control. They are also envisaged as good alternatives to the presently used copper and nickel fungicide combination.

Micronutrient deficiencies

Widespread occurrence of zinc deficiency became a serious limiting factor to crop production. Investigations by the TRI pointed to the usefulness of foliar treatment with zinc sulphate. Following correction of Zinc deficiency, there was a significant crop increase. Further experiments indicated the synergistic value of manganese and boron with Zinc. This has now become an industry-wide practice.

Presently, the scientists at the TRI are attempting to develop an integrated management strategy against root diseases with chemical and biological agents. They are also engaged in evolving remedial measures for blister blight with systemic fungicides having low active ingredient at extended spray applications to minimise the fungicide load, and to quantify the requirement of micronutrients in relation to increased yield levels of tea.

CLONAL PROPAGATION MATERIAL

The price of clonal propagation material has been revised to 20 paise per fresh cutting. The revision is necessitated by increased cost of raising cuttings. The new price will come into effect from October 1, 1995.

Director
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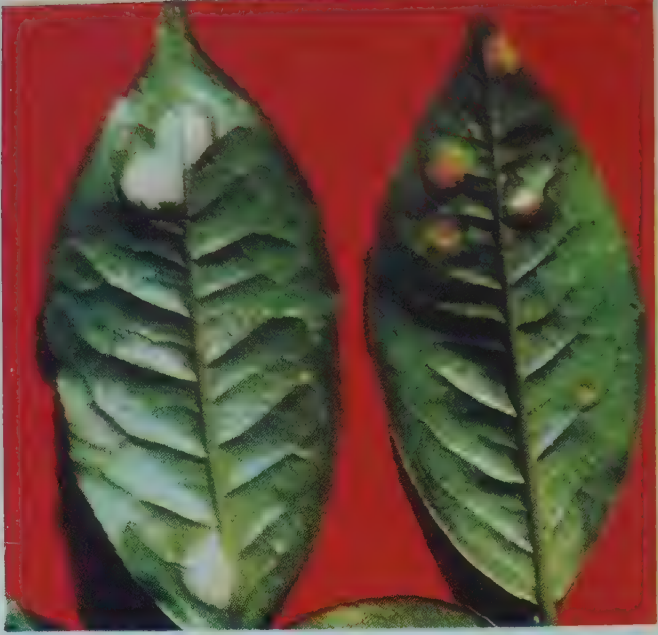
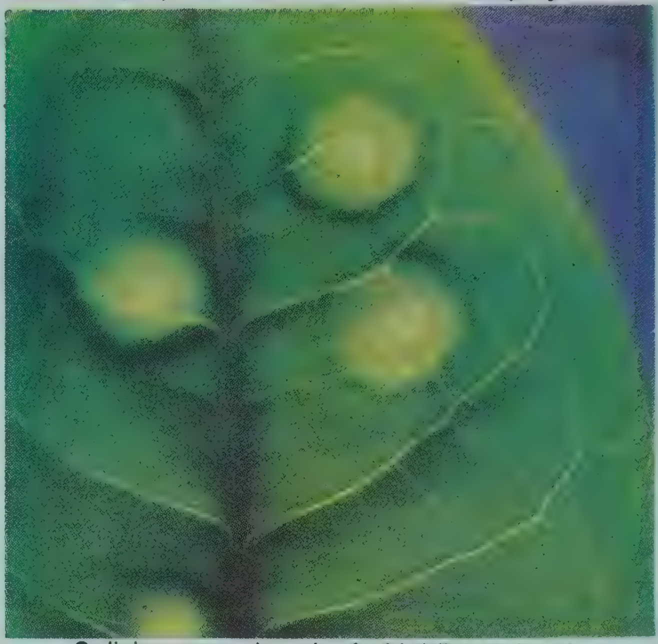
- Due to the above-mentioned benefits, Calixin need not be sprayed as often as contact fungicides.
- Due to the extended spraying rounds, Calixin application is less labour-intensive, and the labour so released can be deployed for other important jobs in the estate.
- Calixin has a pronounced anti-sporulant action, which is of immense significance in the control of Blister Blight, because by suppressing or stopping the production of spores, the inoculum pressure is greatly reduced, and intensity of the disease is minimised.
- Besides controlling Blister Blight, Calixin stimulates the growth of tea shoots, and thereby increases the yield.



Unsprayed leaf **Calixin** sprayed leaf

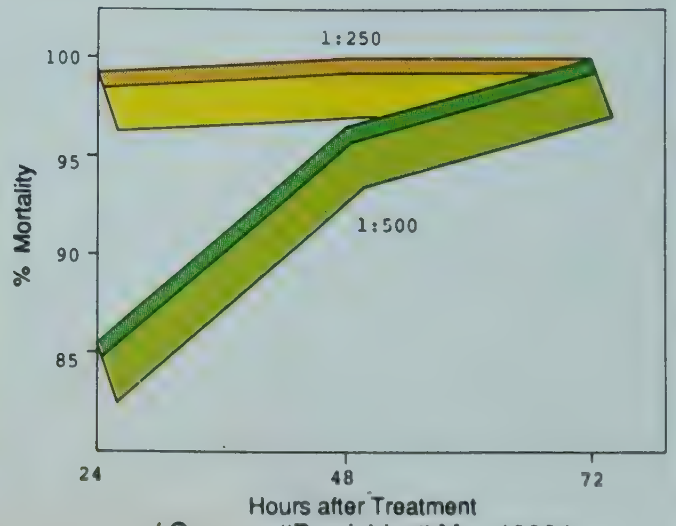


Calixin sprayed tea leaf with blister showing typical green ring circling aborted lesion

- Calixin has contact acaricidal action against Pink, Purple and Scarlet mites, and regular post-monsoon applications of Calixin can eliminate one round of acaricidal spray.

% Mortality of mites with Calixin

Hours after treatment	*Concentration of* Calixin	
	1:250	1:500
24h	99.2	85.4
48h	100.0	96.5
72h	100.0	100.0



(Source : "Pesticides" May 1980)

- Calixin does not taint tea, nor does it impart any unpleasant flavour.

The combined effect of all the above-mentioned benefits:

Calixin *brings more profit to the planter.*

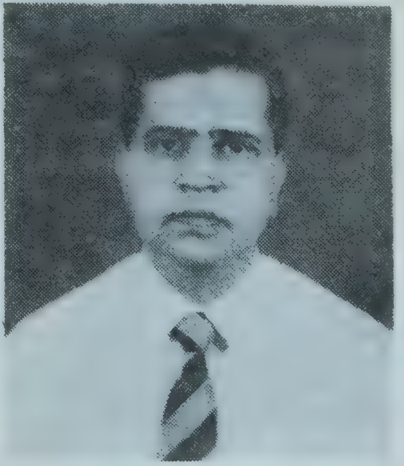
TECHNO-COMMERCIAL ASPECTS OF SHEAR HARVESTING IN TEA

N. SATYANARAYANA *

The UPASI Scientific Department conceptualised mechanization of harvesting tea in South India as early as in the 1950s. Shear harvesting was tried in certain estates during the 1960s, but, efforts towards mechanization were discontinued, probably due to the adverse influence of continual shearing on yield. Hand plucking reigned supreme during the 1960s and 1970s.

Setback to mechanization in the initial phase, however, highlighted the need to formulate a viable schedule that would reduce dependence on hand plucking. This aspect assumed considerable importance in the context of improvement in yield, the need to harvest about 65 per cent of the crop in the two high cropping seasons, constraints in the availability of workers and spiralling labour wages.

These issues led to resumption of investigations on shear harvesting. Long-term experiments involving continual shearing and different combinations of seasonal shearing were carried out in all the Districts in South India. Information on aspects such as the type of shears, intervals of harvesting and the technique of harvesting was generated from the investigations/ observations. Commercial implications were evaluated from the data base.



Continual shear harvesting, howsoever attractive in terms of reducing the requirement of pluckers, adversely affected the yield and health of the bush. Integration of shear harvesting during the two high cropping seasons with hand plucking during the intervening low cropping seasons proved to be an ideal alternative to exclusive hand plucking. This schedule, termed the integrated harvesting schedule, reduces the requirement of pluckers without adverse effects on the yield and health of the bush. Moreover, this schedule has a strong physiological basis in as much as it ensures addition of maintenance foliage once in an year which is vital to sustain bush productivity.

One has to commence shear harvesting after 15 and 18 months from pruning in the case of 'China' and 'Assam' hybrid jats of tea, respectively. Commencement of shearing earlier negates the benefits. Introduction of shears in older fields is not recommended because of operational difficulties.

Harvesting interval is linked to leaf expansion time (LET). Optimal interval is LET x 1.8, provided the harvesting practices recommended are implemented in toto.

Flat shears are superior to step shears and, hence, are recommended. Comparison of shears shown in Table 1 substantiates the statement.

In addition to the schedule of harvesting, time of commencement, interval of shearing and type of shears to be used discussed so far, there is a need to follow the guidelines given in Table 2 for shear harvesting to be successful.

Organoleptic evaluation of samples by professional Tea Tasters has indicated that shear harvesting does not influence the quality of tea. It is often reported that uniformity of shoots obtained from shear harvested fields has been helpful in standardising the process parameters during manufacture.

Currently, shear harvesting is being carried out in 108 out of the 140 estates surveyed. Area under shearing in these estates varies from 40 to 60 per cent. A majority of the estates have resorted to the integrated schedule.

Impact of shear harvesting on yield has been variable. Twenty seven estates have reported depression, while there has been an improvement in 46 estates. Assessment in respect of the remaining 35 estates is awaited. The more important causes leading to the reported decline in productivity are listed below.

1. Inadequate maintenance foliage on the bushes resulting from level plucking as opposed to let up plucking during the drought season
2. Shearing to brown stem damaging the existing maintenance foliage

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* **Dr. N. Satyanarayana, Senior Plant Breeder and Head of Botany Division is with the TRI since 1976.**

3. Perception to maintain level plucking surface which results in mixed severities of shearing
4. Alternation between shear harvesting and hand plucking in successive rounds within a season
5. Commencement of shear harvesting in fourth/fifth year from pruning
6. Non removal of banji shoots
7. Deviation in harvesting interval.

Shear harvesting has been reported to increase the plucking average with a concommitant reduction in the requirement of workers. The extent of benefit with respect to these parameters varies with the yield (Table 3).

An analysis of the cost : benefit in a field where shear harvesting neither increases nor decreases the yield is attempted here. The more important factors considered for computations are given below.

A Cost of a shear is Rs. 160 (including maintenance)

B Shears are durable for two years

C Twenty workers are required for shearing one hectare, at each round

D At an interval of 15 days, 20 workers cover 13 hectares in 13 days (Two holidays are excluded)

E Yield of the field is 2500 kg made tea/ha/yr which is equivalent to 10870 kg green leaf/ha/yr at an average outturn of 23 per cent

F Plucking average due to exclusive hand plucking is 23 kg green leaf/worker

G Plucking average resulting from the implementation of the integrated schedule of harvesting is 27 kg green leaf/ worker

H Wages/worker/day including perks is Rs. 60/-

$$\text{Cost (Rs/ha/yr)} \quad \frac{AC}{BD} = \frac{160 \text{ X } 20}{2 \text{ X } 13} = 123$$

$$\text{Benefit (Rs/ha/yr)} \quad \left[\frac{E}{F} - \frac{E}{G} \right] H$$

$$= \left[\frac{10870}{23} - \frac{10870}{27} \right] 60$$

$$= \quad 4200$$

Cost : Benefit = 1:34

The techno-commercial information and cost : benefit analysis projected here should induce implementation of shear harvesting in all the fields in estates where shear harvesting is in progress. In those that have not yet resorted to shearing, isn't it time?

Table 1 : COMPARISON OF SHEARS

No.	Aspect	Flat shear	Step shear
1.	Harvesting flush shoots	complete	Incomplete
2.	Harvesting banji shoots	More effective	Less effective
3.	Crop loss	No	Yes

Table 2. : TIPS ON SHEAR HARVESTING

No.	Do's	Dont's
1.	Add maintenance foliage by harvesting crop shoots above mother leaf from mid-December to mid-March	Pluck to the level from mid-December to Mid-March
2.	Hold the leaf collecting tray flush with the plucking surface while shearing	Lift or press the shears while shearing
3.	Shear to green wood and retain the maintenance foliage	Shear to red wook with the object of maintaining level plucking surface
4.	Remove banji shoots following shearing, the same day	Plan separate rounds for removal of banji shoots

Table 3 : COMMERCIAL IMPLICATIONS OF SHEAR HARVESTING

Yield (kg made tea/ha)	Increase in the plucking average (kg green leaf / worker / year	Reduction in the requirement of workers (No. / ha / year)
2000 to 2500	2 to 6	60 to 95
2500 to 3000	5 to 7	110 to 150
3000 to 3500	5 to 9	130 to 180

TECHNOLOGY TRANSFER IN TEA

C.P. DEVASAHAYAM JOSEPH *

Agricultural growth can be extensive as well as intensive. Whilst both have taken place in South Indian tea, it is the latter which is impressive and has played a major role in boosting up crop production. For disseminating research findings from UPASI Tea Research Institute, advisory services have been set up in all the planting districts. In 1926, there was only one Scientific Officer stationed at Devershola Experimental Station. In the last seven decades the UPASI Tea Scientific Department has grown into a network of effective research and advisory centres.

In South India, tea is grown in about 85,000 hectares spread over Karnataka, Kerala and Tamil Nadu. To cover the tea growing areas, there are six advisory centres situated in Coonoor (NPA), Durgadbetta (KPA), Gudalur (NWPA), Meppadi (WPA), Vandiperiyar and Peermade (CTPA) and Munnar (KDPA). Tea area in the Anamallais (APA) is advised by the senior scientists of the Research Institute. The number of member estates and the areas coming under the jurisdiction of each Advisory Centre are given in Table 1.

NATURE OF WORK :

Soil tests to correct pH in tea nursery and tea field : Every advisory centre is provided with pH and EC meters which are frequently used to test the pH & EC of the nursery rooting medium and also to work out the dosage of agricultural lime or dolomite to be applied to tea fields. Defective nursery rooting medium leads to club callus formation and such plants die in the field. Poor growth of clonal tea plants exhibiting profuse flowering in tea fields is due to unsuitable soil pH and the advisory officers advocate appropriate remedial measures.

Testing of copper fungicide formulations : Copper oxychloride formulations are analysed for their pH, suspensibility, and copper content in order to find out their suitability for treatment against the blister blight disease.

Fertiliser analysis : Straight fertilisers are analysed to find out their nutrient values as per the specifications.

Liming materials (agricultural lime and dolomite) : These are tested to find out their neutralising value as per the specifications. Purity of micro nutrients such as zinc are also analysed.

Soil testing laboratory at Coonoor : A fully equipped soil analytical laboratory is established in the 1980's at the Advisory Service at Coonoor. Soil analyses to find out the organic matter status, available major nutrients, Cation Exchange Capacity (CEC), Water holding capacity, Degree of Potassium Saturation (DKS) are being carried out. Details of samples analysed from various planting districts during the last four years are given in Table 2.

Table 1 : TOTAL NO. OF ESTATES AND AREA IN EACH ADVISORY CENTRE

Advisory Centre		No. of member estates	Area in hectares	Year of Commencement
1. Anamallais	(APA)	36	13809.00	1964
2. Coonoor	(NPA)	31	6178.00	1965
3. Gudalur	(NWPA)	10	3379.14	1980
4. Karnataka Durgadbetta	(KPA)	10	1771.61	1986
5. Munnar	(KDPA)	26	10498.00	1968
6. Meppadi	(WPA)	14	5333.00	1972
7. Vandiperiyar & Peermade	(CTPA)	45	10246.74	1964

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* Mr. C.P. Devasahayam Joseph, Senior Advisory Officer, Nilgiris joined UPASI in 1968.

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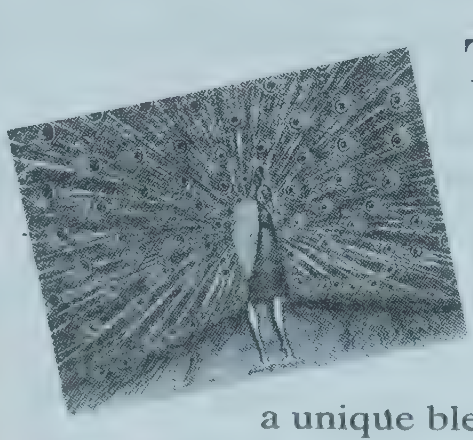

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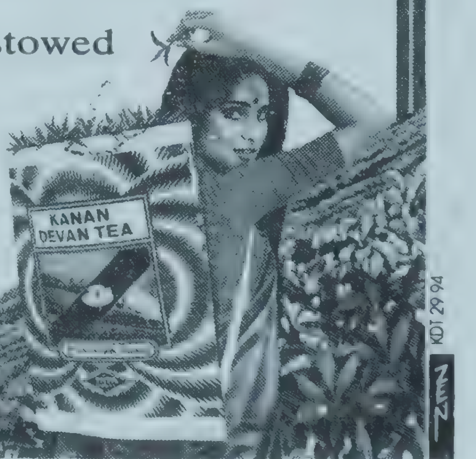
KANAN
DEVAN TEA
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Research Priorities

Expansion of soil testing laboratory : The present laboratory is equipped to carry out only analysis of major nutrients. The laboratory will soon be strengthened to analyse micro nutrients as well. Further, the laboratory would be equipped with additional sophisticated instruments.

The Sub-Station at Vandiperiyar would also be equipped to carry out complete analysis of soil to cater to the needs of Central Travancore region. The equipments for these will be acquired from the VIII plan project funds.

Clonal selections, composite plants and other botanical aspects : Clonal selection work, to find out outstanding material having drought tolerance, high yield and quality, early rooting and other desirable morphological characters are being carried out in the advisory centres. The techniques of producing composite plants/ nursery grafts and the method of shear harvesting have been demonstrated to all the estates.

Pest and disease control : Blister blight, caused heavy crop losses in the early years of its incursion in Anamallais, Peermade, Wynaad, Nilgiri-Wynaad and Karnataka. Intensive research by the UPASI Tea Scientific Department, resulted in evolving cost effective management strategies and they were effectively communicated to all member estates in the remote tea districts through Advisory Service.

Similarly an endemic pest like *Helopeltis*, causing havoc and heavy crop loss in tea fields for more than three decades in Central Travancore and few other estates was controlled by the timely and effecient advise through the Advisory Service.

Identifying root disease patches : Suitable recommendations are made to control various primarly root diseases.

Testing of Tea Samples : Tea samples are being tested according to the standard specifications of Prevention of Food Adulteration Act (PFA) and the Bureau of Indian Standards.

Crop Production Estimates : The crop production estimates are prepared on quarterly and half yearly basis in accordance with agro-climatic conditions of different tea districts and compared with the actual records.

Research/Advisory Meet : The progress of work in field trials are reviewed by the Director and the Heads of Departments. This is an annual event at the UPASI Tea Research Institute. Field trials on manuring, Plant protection, weed control, Plant physiology, Harvesting etc., are carried out by the Advisory Centres in co-ordination with the Heads of Departments, based on the findings of the experiments recommendations are made to the tea industry.

Table 2 : NUMBER OF VARIOUS SOIL ANALYSIS FROM DIFFERENT PLANTING DISTRICTS

Planting	1991			1992			1993			1994		
District	Soil	Liming	Fertilizer	Soil	Liming	Fertilizer	Soil	Liming	Fertilizer	Soil	Liming	Fertilizer
Nilgiris	753	47	18	781	62	21	978	36	24	757	35	31
Nilgiri - Wynaad	692	147	—	502	76	2	503	7	1	329	4	—
Wynaad	322	4	—	320	10	—	259	2	—	85	—	3
CTPA	530	9	5	407	5	—	289	17	—	440	9	—
Anamallais	713	—	—	575	3	—	1373	—	—	814	2	—
Karnataka	112	3	—	219	1	1	384	3	—	68	2	—
High Range	22	—	—	22	—	—	20	—	—	2	—	—
Small growers	984	8	2	1224	8	6	898	4	8	903	14	2
Others	625	11	3	850	9	3	580	4	5	1427	7	60
	4753	229	28	4400	174	34	5284	73	38	4825	73	96

Lectures and Field Demonstrations : The Advisory Officer conducts training courses, field demonstrations and delivers lectures on tea culture to executives of the tea industry under request by the estate Managements.

Overseas visitors are also taken to member estates to acquaint them on the latest developments in the scientific techniques presently adopted in tea fields.

Area Scientific Conference : This conference is held once in an year in each planting district and provides an opportunity for planters, scientists of the TRI and the advisory officers to discuss various matters relating to tea culture.

Joint Area Scientific Symposium (JASS) : The Symposium is conducted once in two years in planting district. Importance is given to field visits wherein, scientists, executives of the tea industry and advisory personnel interact.

The Advisory Officers assist Tea Estates to prepare manurial schedules as per recommendations of the Scientific Department. Programmes for Plant Protection and their estimates for the forthcoming financial year are drawn based on current recommendations.

Role of UPASI Service to Small tea growers : The UPASI Tea Advisory Service extends its services by communicating the recommendations on the scientific aspects of tea cultivation to the small farmers holding up to 8 ha, free of charge. The individual properties are visited, their problems are discussed on the spot and reports in local language sent.

Services to small growers are required in Nilgiris, Nilgiri Wynaad and Central Travancore, where there are several thousands of small tea growers, cultivating tea for their sustenance.

Supply of clonal tea plants : This is also part of the responsibility of the Advisory Centres in Nilgiri-Wynaad and Central Travancore. Supplying high yielding clonal tea plants and shade tree saplings to member estates and small tea growers are carried out on first come, first serve basis.

Productivity increase in member estates : Regular advisory visits are made to all the member estates to learn the factors limiting the yield increase. After a thorugh investigation of the constraints, recommendations on remedial measures are made.

CONCLUSION :

The productivity increase achieved in the different tea planting districts, clearly indicates awareness of scientific approach to agricultural practices. Transfer of precise agricultural technology is absolutely essential in the highly competitive tea market situation. For containing the cost of production, the crop production has to be boosted from time to time and year after year and the tea industry largely depends on the scientific research and its dissemination by the UPASI Advisory Services.

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TISSUE CULTURE TECHNOLOGY FOR TEA

L. MANIVEL, V. PANDIDURAI and K.S. MURALI

Progress made in the micropropagation of tea clones through tissue culture has been reported in Planters' Chronicle in November, 1993. The work was pursued further and the updated achievement is given on the following pages.

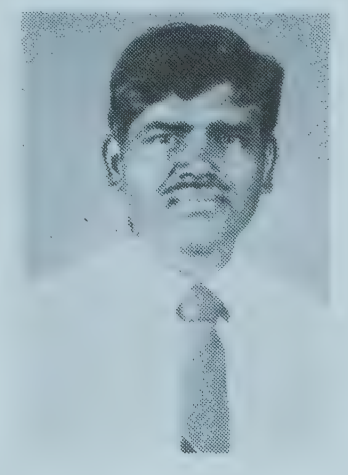
The micropropagated plants of the recently released UPASI tea cultivars viz., UPASI-26, UPASI-27 and BSB-1, were transferred to soil media and hardened in the poly-house with intermittent sprinklers under intensive nursery care. The plants looked normal and reached the plantable height in 15 months from inoculation.

In order to test the variability of the plants produced through tissue culture, 35 plants were put out in the field alongwith 30 vegetatively propagated plants of UPASI-3, 26 and 27. They are under observation (Plate).

Microbial contamination originates from the field, being transmitted by the explants from the mother plants. Treatment of mother plant with fungicides, surface sterilisation of explants and incorporation of antibiotics in the media minimised the contamination rate. The regenerated plants in the field, however, did not exhibit any distress due to the contaminants.

It takes almost 15 months from inoculation to planting and this long period, increases the cost of plants. Ways and means for curtailing the period by accelerating the growth in the nursery by various means, are being worked out.

Ultimate objective of the project is to evolve a drought tolerant elite clone using UPASI-3 as a targeted material. Induction of variations through in vitro mutation breeding, embryoids and protoplast fusion are planned for which assistance from funding agencies have been sought. Evolution of drought tolerant transgenic plants through use of recombinant DNA and injection of drought tolerant genes is a distinct possibility in the future.



Dr. L. Manivel, Head Division of Plant Physiology attended the International Conference organised by the American Society for Horticultural Science from July 30 - August 2, 1995.

The conference was held at the Convention Centre of the Greater Montreal for four days. The conference had been attended by delegates representing 28 countries. There were about 500 oral presentations and 1000 poster presentations. In addition to these presentations there were concurrent workshops on special topics like bud dormancy, uses of growth regulators in fruit and nut crops and nutrient management in orchards, commercial tissue culture and its limitations, etc.

Dr. Manivel presented a paper on "Plant Growth Regulators for Crop Management in Tea", the only paper on plantation crops, under the section PGR/Cross Commodities. The paper elicited some good discussion on the toxicology, active ingredients and practical implication on other crops.

He also visited Silsoe College and Plant Breeding International (PBI) of Unilever, Cambridge UK for two days to interact with the scientists on water management and Plant Breeding in tea. Silsoe College works on projects pertaining to Tanzanian tea while the team in PBI works on breeding and gene manipulation of tea cultivars from Kenya, India and Sri Lanka.

N. MURALEEDHARAN
(Joint Director)

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* **Dr. L. Manivel is senior Plant Physiologist and Head of Division. Before joining the TRI in 1989, he was with the Tocklai Experimental Station in Jorhat, Assam.**

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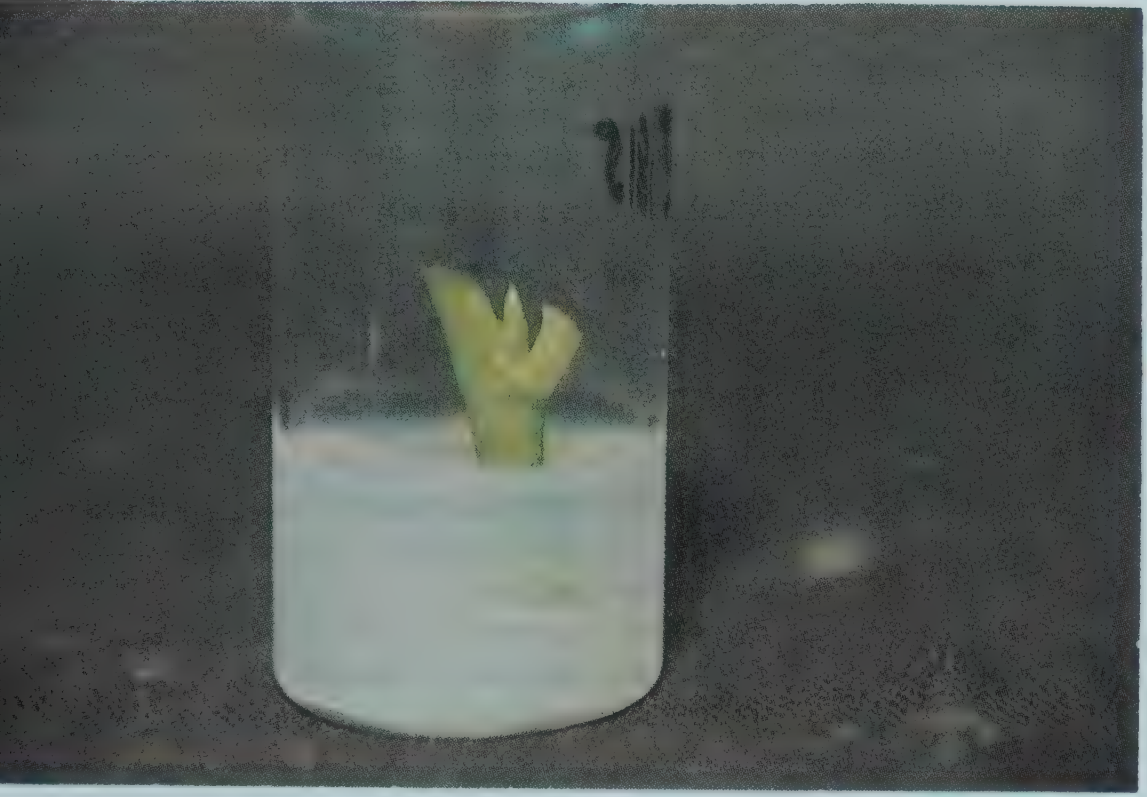

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2 Axillary bud usec

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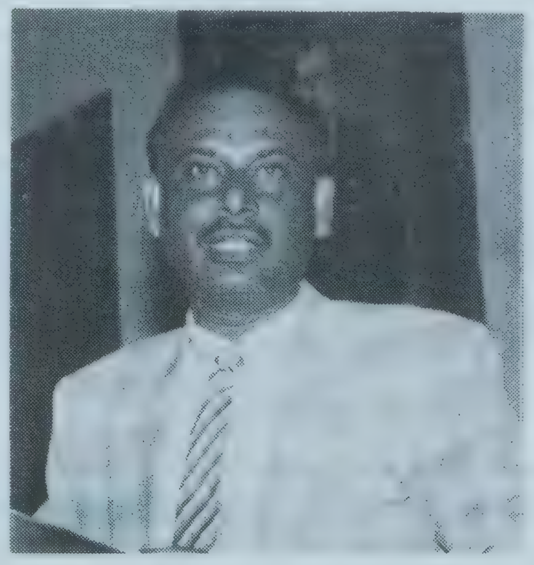
MILESTONES IN NUTRIENT MANAGEMENT OF TEA

D.P. VERMA *

Nutrient management of tea recommended by UPASI Scientific Department has paid rich dividends in increasing productivity in south India. The concept of manuring is based on "expansion ratio manuring", which is primarily on "Replacement theory". The anticipated yield of a field forms the basis for calculating the fertiliser requirement. The basic system has been periodically modified with newer concepts leading to improvement in cultural, plant protection and management techniques. Theoretical, economical and practical aspects are taken into account for formulating the recommendations. The steep hike in the prices of fertilisers conjoint with a fall in the prices of tea in recent years, led us to review our manuring recommendation; as a result interim recommendations based on literature, survey data and experimental trends were released in September, 1994. The current information available on nutrition of tea is reviewed here. South India can legitimately be proud of its remarkable increase in tea productivity from 685 kg in 1946 to about 2200 kg per ha in 1994. The nutrient management has indeed played a key role in the increase of tea productivity. The significance of fertiliser use can be judged from the fact that growth in fertiliser consumption and tea productivity have gone up almost together. The importance of manure application was emphasised as early as in 1926 and recommended mixtures included ingredients such as castor cake, groundnut cake, blook meal, steamed bone meal, super phosphate, muriate of potash and nitrate of potash. A total of 950 kg/ha of this mixture, containing 5.7 per cent nitrogen, 5.2 per cent phosphoric acid and 5.0 per cent potash was recommended for a single application, immediately after pruning. This was intended to meet the manurial requirements for the three years of a pruning cycle. Later, the Department recommended two types of mixtures; one called pruning mixture to be applied immediately after pruning and the other known as general mixture to be given annually. Subsequently, pruning mixture was withdrawn because it was found that pruned bushes without leaves were unable to utilise the nutrients.



During early forties, the importance of maintaining organic matter status of soil by retaining pruning litter and shade tree loppings was recognised. In late forties, the existence of tea was threatened by wide spread defoliation, debilitation and incidence of red rust. The causative factor of this malady was recognised as deficiency of potassium (K). Since then, the emphasis has been on adequate application of K in combination with nitrogen to maintain high yields. Correction of zinc deficiency in the early sixties led to a dramatic increase in crop production. The manuring policy took a definite shape in the early 1960's when the results of classical experiments carried out at Devarshola from 1939 to 1953 were processed. Detailed investigations on the fine aspects of manuring, carried out during the late 1960's to 1990 led to the publication of comprehensive recommendations on various aspects of manuring. The current nutrient management strategies that have been refined over the years are discussed below:

NITROGEN (N)

Response to N is chiefly dependent on organic matter (O.M.) status, climatic factors and availability of other nutrients. In south India, N level is recommended on the basis of organic matter (O.M.) status of the soil and anticipated yield. For the estimation of anticipated yield, the yield of the second, third and fourth years of

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* **Dr. D.P. Verma, Senior Chemist and Head of Soil Chemistry Division joined the TRI in 1990. Earlier, he had served in the Research Projects of ICRISAT, Hyderabad, and World Bank and UNDP-FAO projects in Yemen and Sudan.**

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the preceding pruning cycle may be considered. If the weather pattern in any of these years appears abnormal, the cycle prior to that may be taken into consideration. The mean yield of these years is taken as 100. The yield in different years of pruning could then be predicted as follows :

First year	: 65 to 85 per cent of the mean
Second year	: 100 per cent of the mean
Third year	: 110 to 120 per cent of the mean
Fourth year	: 110 to 120 per cent of the mean

For tea soils with low/medium/ high 0.M status, twelve/ten/nine/ kg N per 100 kg made tea with a minium of 160/120/100 kg N per ha, respectively, is recommended for yields upto 2000 kg/ha. At and above 2100 kg made tea per ha, additional N at five/five/four kg N per 100 kg made tea is recommended for low / medium / high 0.M tea fields. Ammonium sulphate (SOA) has been found to be a superior source of N to calcium ammonium nitrate (CAN), which in turn, is superior to urea. To meet the N requirement throughout the growth period, it should be applied in four to six splits avoiding very wet and dry periods. Regular application of adequate N is essential to sustain high productivity.

POTASSIUM (K)

Potassium is the second major nutrient of tea after N. The soil exchangeable K fraction is generally low to medium category and hence frequent application of K is warranted. A proper ratio of N: K_2O irrespective of sources of N should be maintained, in the pruned year, depending on the height of pruning.

Height of pruning	N: K_2O ratio
Rejuvenation and pruning below 45 cm	1:2
Pruning between 45 and 60 cm	2:3
Cut across at and above 60 cm	1:1

In the remaining years of the pruning cycle, irrespective of yield level, the following N : K_2O ratios are suggested depending upon the sources of N.

Source	N:K_2O ratio
Urea	4 : 3
CAN	4 : 3
SOA	2 : 1

The high rate of potassium (N : K_2O :: 1 : 2) in the pruned year was quite effective in protecting the bushes from new attack of shot-hole borer (*Xyleborus fornicatus* Eichhoff) and increasing the mechanical strength of stem in infested fields.

Three to four applications of urea and muriate of potash (MOP) each at one per cent, at monthly intervals, during the dry period is recommended in young/mature tea to maintain turgidity of cells, improve water use efficiency and to reduce banji shoot formation.

PHOSPHORUS (P)

Results of a long term field trial showed that all forms of P, water soluble, citrate soluble or acid soluble are equally efficient. The use of rock phosphate is recommended for economy in tea soils of south India. However, in soils with a pH more than 5.5, use of water soluble phosphate is recommended. Phosphorus should be applied on the basis of available soil p content and yield level. For yields upto 3500 kg made tea per ha, the available P in surface soil (0 to 22.5 cm) should be maintained at and above 22 ppm (Bray II modified method); P application may be deferred by one year if available P is above 22 ppm. For yields above 3500 kg made tea per ha, the available P in surface soil should be maintained above 44 ppm; P application may be deferred by one year if available P is above 44 ppm. In subsequent years, P application should be based on soil test value. Phosphorus should be placed at 15 to 25 cm depth in the holes made on both sides of each tea bush on the upper side of the slope. This is recommended to reduce fixation and to create a concentration gradient which helps in the diffusion of P and better utilisation by the roots. It is preferable to apply P before the monsoon.

CALCIUM (Ca)

Liming is recommended only for mature tea fields that are under regular plucking. The liming rate is determined taking into account soil pH, rainfall, yield level and the length of pruning cycle. Liming material is to be broadcasted prior to pruning. It could also be applied at the end of second year after pruning but this should not in anyway interfere with the regular

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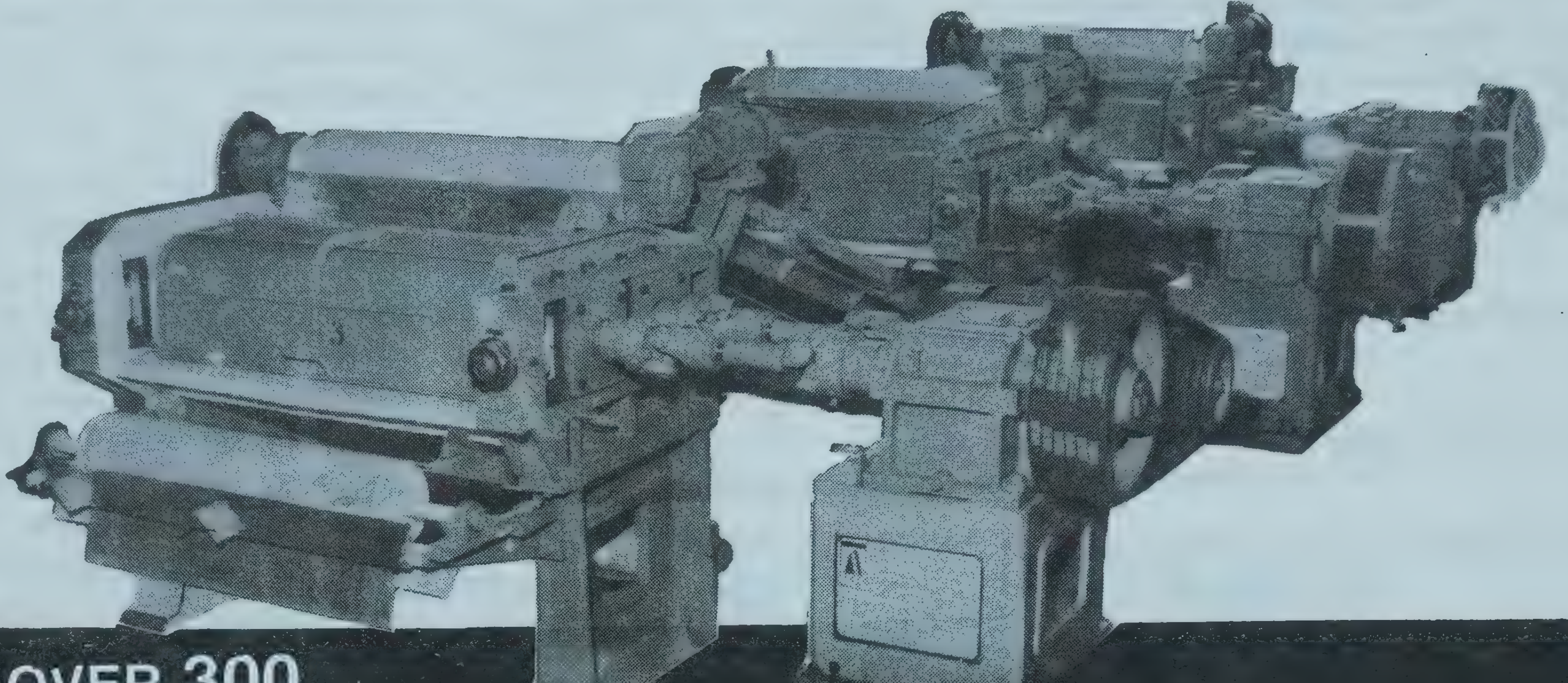

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manuring schedule. There must be a minimum of four to six weeks interval and 15 cm rainfall between liming and fertiliser application and *vice versa*. The maximum quantity of lime per application should be restricted to four tonnes per ha. If higher rate of application is needed, it may be applied in two splits, one before pruning and the other in the middle of the pruning cycle. Agricultural lime or Dolomitic lime recommended for liming and it should contain 60 per cent or more calcium as calcium carbonate and total neutrality value including calcium and magnesium as calcium carbonate should be 80 per cent or more.

MAGNESIUM (Mg)

The levels of exchangeable Mg in tea soils of south India are of generally low to medium category and not adequate to maintain the high productivity. If liming is done using Dolomitic lime (3.6 per cent Mg), there is no need for additional application of Mg, to fields yielding below 3000 kg made tea per hectare. But at and above 3000 kg made tea per ha, ten to fourteen kg of magnesium sulphate/ha/year should be applied as foliar spray in one or two per cent concentration. Foliar sprays are to be given in four to six splits, at monthly interval during peak growth periods. Magnesium sulphate is compatible with zinc sulphate and therefore, they may be applied together, without incurring additional expenditure on spraying.

SULPHUR (S)

Sulphur is derived from organic matter in the soil but not adequate to maintain the high pruductivity of tea. The requirement of sulphur could be adequately met by applying 20 per cent of total nitrogen in the form of sulphate of ammonia (SOA). However, some adjustments can be made during a crisis period. In a four year cycle SOA may be applied in the pruned year and third year. Alternatively, ten per cent of total N may be applied annually in the form of SOA. SOA application should not be completely skipped because sulphur deficiency may arise, adversely affecting the yield.

ZINC (Zn)

Zinc deficiency is widespread and its correction by foliar application has become a routine practice to maintain high productivity of tea. Zinc sulphate of 95 per cent purity with less than 1000 ppm sodium content and less than 0.1 per cent iron (Fe) is recommended for foliar application. At present, six to ten kg of zinc sulphate/ha/year at one per cent concentration is recommended for application along with 500 ppm Mn (1.54 g manganese sulphate per litre) and 100 ppm B (0.57 g boric acid per litre) in four to five splits (two pre-monsoon and two or three post-monsoon). The quantity of spray fluid recommended is 200 litres per ha, using a mist blower. One row of tea bushes on either side of the operator may be covered. Zinc sulphate has to be applied on the next day after plucking. Application of zinc to pruned field is very critical. First application should be made at three to four leaf stage during recovery of bushes and second application at tipping stage.

PROGRESSIVE AUDIT OF N and K

Progressive audit of the requirement of N and K may be carried out on the basis of yield obtained during the course of the year. In this system, rate of N application in each split is based on the actual yield obtained during specified periods preceding the split applications. The rate of N is determined on the basis of the principle of nutrient replacement, as explained elsewhere in this article. The total N required may be applied in five splits in April, May / June, and August/early September, October and end November / early December. The rate of K may be determined as per the N : K_2O ratio to be applied as well as the sources of N.

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concerns, there is an emerging demand of organic tea in the world over especially in western countries. The Division has prepared a "Technical Dossier on Organic Tea" which had been submitted to European Economic Community Trade Centre, Bruxelles by Tea Board, Govt. of India, Calcutta. Organic tea is produced in the absence of synthesized chemicals like pesticides, fungicides, herbicides, growth regulators and concentrated fertilisers. Naturally occurring mined products (rock phosphate, dolomitic lime), compost, oil cakes and green manures are used for nutrition and maintenance of soil fertility. Wood ash, bone meal, fish meal and other manures of organic origin can also be used if available from unpolluted environment. Biofertilisers or microbial inoculants can be successfully employed in organic tea cultivation. Pests and diseases are controlled by the use of resistant cultivars, regulating the micro-climate or by introducing biological control methods and / or the use of biological products, naturally extracted without the use of inorganic solvents. The tea can be marketed as "Organic tea" only after the completion of a conversion period of three years.

AREAS FOR FUTURE RESEARCH

There is a need to estimate the efficiencies of soil and fertiliser N and K in different agroclimatic zones to formulate a theoretical basis of yield prediction and rationalisation of N and K. Foliar nutrition of P deserves attention. Work is needed to rationalise magnesium levels for soil and foliar application and also to examine the efficacy of different Mg carriers for identifying the most economic source in tea. The quantification of sulphur requirement of tea needs to be re-examined and a search for sources of sulphur, cheaper than SOA is required. Foliar application of zinc sulphate depending upon the yield levels is being standardised. More research is needed on interactions among various macro and micro nutrients to refine the fertiliser recommendations further for sustainable productivity of tea.

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UPASI ADVISORY CENTRES – A SUCCESS STORY OF EXTENSION ACTIVITIES

J.B. HUDSON *

South India occupies a prestigious place in the country's tea map with high level of productivity, accounting for 23 per cent of the output from 18 per cent of the national tea area. Productivity has witnessed a quantum jump from a level of 1379 Kg per hectare in 1970 to 2152 Kg per hectare in 1993. The success story involving the impressive growth is no doubt due to the strides made in the various fields of research and the effective transfer of technology to the end user. The Research-Extension linkage in UPASI Scientific Department is unique as it comes under a single umbrella, unlike many other institutions where research and extension activities function as separate entities.

The success of any strategy or programme for development would doubtless depend on the correct identification of the problem and finding a specific solution for it. While topographical and agro-climatic conditions contribute significantly to yield levels, the disparity in the productivity among the estates in a district could be due to several factors. The Advisory Centres play the pivotal role of identifying the reasons for the gap between the potential and the actual yields and offer suitable remedial measures, utilising the various recommendations from the Research Institute. Thus advisory service is multifaceted and cuts through the entire gamut of tea cultivation. This article spotlights the achievements in the different disciplines arising out of the various extension activities of the Advisory Centres.

I. FIELD MANAGEMENT :

i) Pruning :

The pruning practices in South India have undergone a metamorphosis, the most noticeable change being the shift in the style of pruning. Till the early eighties, several estates had adopted the practice of repeated hard pruning under the belief that this would lead to a healthy come back. The thick healthy productive branches were also invariably removed under the pretext of cleaning the bushes! This had resulted in tremendous crop loss, more so, in the initial phase of the pruning cycle. The strategies for developing healthy frames by adopting appropriate tipping height, proper manuring and plucking policies and the advantages accruing from higher cut across pruning were repeatedly highlighted during the advisory visits and this, brought about a welcome change. The higher cut across pruning presently followed by the estates has been beneficial in achieving higher yields from the year of prune itself.

The attendant hazards of dry weather pruning has been well recognised by the estates. Currently, pruning is mostly carried out prior to the high cropping months. This has helped in the early recovery of bushes and better distribution of crop.

In conjunction with the shift in style of pruning, the length of pruning cycle has also changed. The estates have now optimised the length of cycle based on parameters such as jat of tea, height of last pruning, cropping pattern and plucker utilisation. Estates have also been assisted in identifying the areas suitable for rejuvenation.

ii) Tipping :

Adopting of correct tipping heights in relation to the height of pruning not only resulted in sustained productivity but also facilitated development of healthy frame and made the bushes amenable to lighter forms of pruning in the subsequent cycles.

iii) Plucking :

With continual improvements in field practices, the tea bush productivity in South India has increased significantly. The exploitation of yield potential is much influenced by the plucking techniques employed. The emphasis has been to harvest maximum crop without sacrificing

---

* **Mr. J.B. Hudson, Senior Advisory Officer, Munnar is with the UPASI since 1976.**

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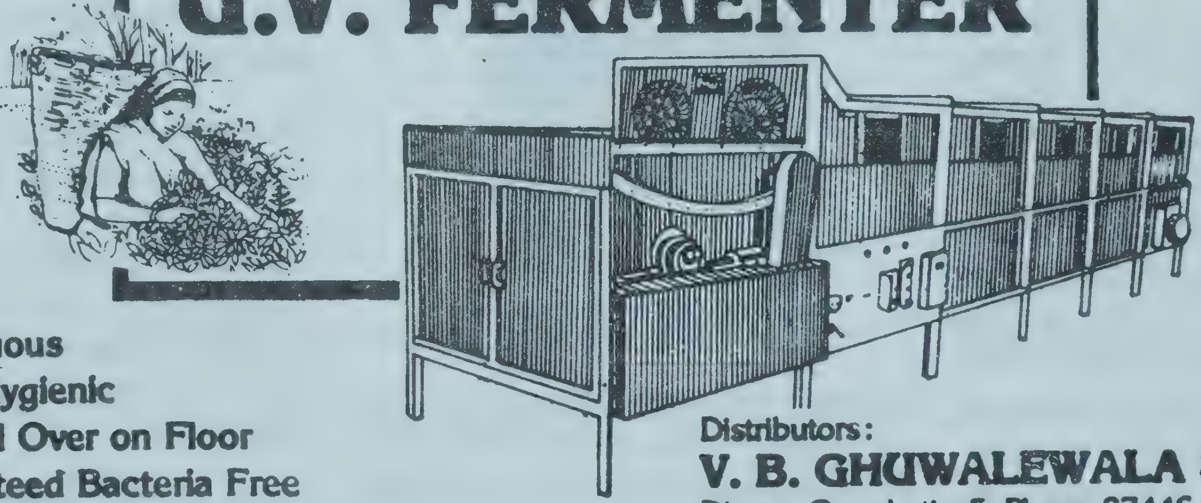

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the health of the bushes, by maintaining the required depth of maintenance foliage. Finer aspects of plucking such as selectivity in plucking, breaking back, removal of banjis have been brought into focus. Leaf expansion studies have been carried out in all the districts, and suggestions on optimum plucking intervals have been made. However due to shortage of pluckers, plucking rounds were extended far beyond the optimum intervals during the high cropping periods. This problem has been successfully overcome in many estates by integrating shear harvesting in the regular plucking programme.

iv) Shade :

An awareness has been aroused in the districts on the ill-effects of excessive as well as inadequate shade in tea fields. Estates have been guided to establish the optimum stand of shade based on elevation, soil type, jat, orientation of the field, and prevalence of drought, and also to regulate shade by pollarding and lopping.

v) Fertilizer application :

The progress made in the field of plant nutrition no doubt has helped the South Indian tea industry build up the yield levels over the years. The estates are assisted in preparing detailed manuring programme based on the anticipated yield and soil nutritional status and subsequently in rationalising the input levels by progressive auditing. Thus the estates have been able to get maximum return on the money invested on fertilizer.

vi) Correction of zinc deficiency :

The Scientific Department's recommendation on correction of Zinc deficiency has been widely adopted. Observations made on the occurrence of zinc deficiency symptoms during the advisory visits have helped the estates in fine tuning the operation by proper timing, and using the required quantity of zinc sulphate and spray volume.

vii) Plant protection

a) Pest control

Tea pest problems in South India are varied and complex. The population trends of the major pests have been studied in the districts and guidelines given on the choice of pesticides in relation to occurrence of pests, spray volume and spraying techniques have helped the estates in achieving satisfactory control of the pests. The integrated management programme recommended by the Department for the control of shothole borer has been immensely useful in keeping the population of this destructive pest below the economic threshold level.

b) Disease control :

Areas affected by primary root diseases are no longer seen in many estates while in others it is of lesser magnitude. This testifies the services rendered by the advisory centres in identifying the problematic areas and successfully controlling the pathogen.

The problem of wood rot and canker has been effectively tackled in several estates by undertaking rejuvenation pruning. Necessary precautions are taken while planting to avoid occurrence of collar canker in young tea.

Blister blight is the most serious problem and the Department's recommendations have been implemented in all the districts and the loss of crop due to this dreaded disease has been averted in most cases.

c) Weed control :

The South Indian tea industry can legtimately be proud that chemical weed control has become a regular practice unlike the situation in many other crops where weed control is either done mechanically or chemical control measures are taken up half-heartedly. Depending on the weed complex, weed management programmes have been drawn for estates for implementation.

d) Maintenance of spraying equipments

For effective execution of plant protections measures, proper maintenance of the spraying equipments is a prerequisite. Survey of the general condition of the spraying equipments, nozzle, pressure applied, discharge rate, spraying techniques was carried out in all the planting districts and the observations and suggestions emerging out of the survey have been brought to the attention of the management. This has been immensely useful in finetuning the spraying operations and thereby achieving a better control besides economising on the cost.

II. SOIL MANAGEMENT :

i) Soil testing :

Regular soil analysis is the prime requisite for maintaining soil fertility. While the Coonoor Advisory Centre has the infrastructure for undertaking complete analysis, other centres have facilities for analysing soil reaction, electrical conductivity and organic matter status. The soil testing consciousness among tea estates is quite encouraging and soils are analysed at least once in a pruning cycle.

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ii) Correction of soil acidity :

The high rainfall received in many districts and the continual use of acid forming fertilizers have made the tea soils very strongly acidic to extremely acidic warranting application of lime once or twice in a pruning cycle. Thus recommendations made on liming have been useful in enhancing the productivity of several estates.

iii) Maintenance of organic matter status :

The tea soils of South India are basically poor and their tilth and fertility rest on their organic matter content. Maintenance of organic matter status of soils is therefore a necessity to maintain productivity in the long run. This recommendation has been taken seriously by the estates, borne by the fact that the organic matter is conserved by chopping and retaining the prunings and shade loppings or by burial of prunings. Certain estates resort even to application of extraneous sources such as compost and tea waste.

iv) Soil conservation :

The Advisory Centres can rightfully claim the credit for creating an awareness on soil conservation in the estates. Soil conservation measures are duly adopted as a rule in the new clearings in all the districts. In mature tea these measures are adopted to varying degrees in the different districts.

III) NURSERY MANAGEMENT :

Replanting the intrinsically low yielding China fields and consolidation of the stand of tea in the other sections of tea through infilling are two thrust areas for vertical growth of tea industry. The choice of the planting material and the quality of the plants used makes all the difference between success and failure in any planting programme. Thus a nursery that produces the required number of plants of desired quality at acceptable costs is the backbone of the above long and medium term improvement activities of the estates. Nurseries are seldom missed during the advisory visits. Explicit guidelines on raising plants and the remedies for maladies, if any, have been provided to the estates.

The management have also been motivated and guided in undertaking cleft grafting. This technique has been mastered in several estates, achieving fairly high percentage of success.

IV) WEATHER MANAGEMENT :

Frost is an annual recurring hazard in sizeable acreage of the elevation districts of Nilgiris and High Range. The Scientific Department has made specific recommendations to minimise frost damage and harvest the maximum crop from such areas during the period free from the damage.

Drought is a recurring phenomenon in almost all the planting districts although the intensity and extent varies among the districts. Drought management strategies such as maintenance of organic matter status, moisture conservation trenches, optimum stand of shade, foliar application of NK, appropriate ameliorative measures in young tea have been implemented in the estates and this obviously has been beneficial in mitigating the ill effects of drought to a great extent.

Estates have also been guided in establishing wind belts at strategic locations and proper management of wind prone fields.

V. COST MANAGEMENT :

Tea industry has been caught in the web of ever spiralling labour wages and cost of inputs and uncertain tea prices. Periods of boom alternate with periods of depression. For economic survival it has thus become necessary to contain the costs by increasing the productivity of the bush and the worker and improve the quality of end product and thereby the price realisation.

The Scientific Department has critically analysed plucker utilisation in the different estates and the plucking average achieved and necessary suggestions have been made on deployment of workers, supervision, lane cutting and mechanical harvesting. This admittedly has been beneficial in increasing the productivity of the pluckers. Rationalisation of fertilizer inputs, need based application of pesticides, finetuning of disease and weed control measures are other areas in which the estates have been assisted in containing the cost.

While we look back with satisfaction on the achievements, the goal of the extension wing is to ensure cent per cent adoption of all the packages offered by the Scientific Department. It is gratifying that the services rendered by the Advisory Centres have been well acknowledged by the member estates. The ever-increasing demand on the advisory visits is a clear testimony to this and it also justifies the saying :

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THE ROLE OF UPASI TEA ADVISORY SERVICES IN THE PROGRESS OF THE TEA INDUSTRY

S.B.K. MURTHY*

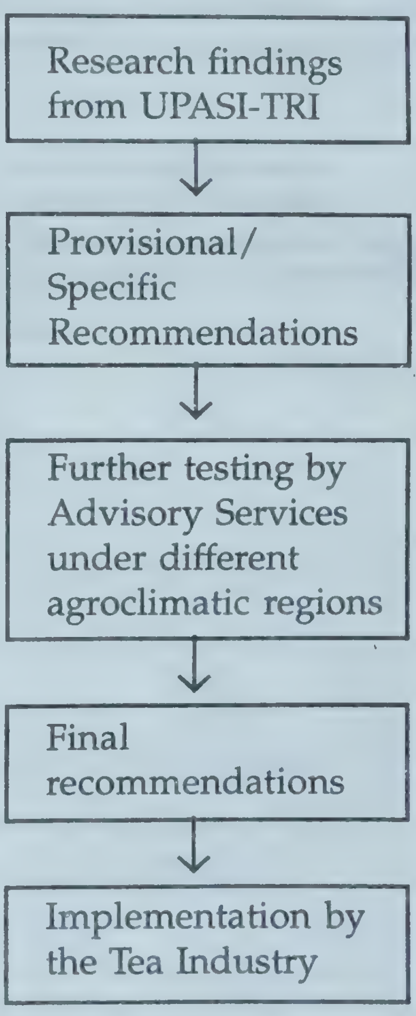
It is an established fact that development in any field of agriculture depends largely on the process of transfer of technology. The findings of the research institutes become void if they do not reach the farming community. Realising this, the research findings of the Tea Research Institute are being effectively communicated by the advisory service centres for implementation by the tea industry. The extension activities were strengthened by setting up a full fledged sub-station in Vandiperiyar in 1964. This was followed by the Advisory Centres in the High Range in 1968 and Nilgiris, Wynaad and Anamallais in 1971. The sixth Advisory Centre was setup in 1980 in Gudalur for extending the services to the tea areas in Nilgiri-Wynaad region. The seventh one was established in Durgadbetta, Karnataka in 1987. Thus, all the tea districts in South India are covered by the UPASI Tea Advisory Services. These centres ensure effective and uninterrupted transmission of farm knowledge to all levels of executives, decision makers and workers in tea industry.

A Crucial ingredient in technology transfer is the communication system. UPASI Tea Advisory Centres have been active on this vital front. The UPASI Tea Research Institute in order to achieve effective dissemination of recommendations and new technologies to the member estates conduct in coordination with the advisory service centres, the following events :

1) Joint Area Scientific Symposia, 2) Area Scientific Meetings, 3) Training classes and 4) Field demonstrations. Thus, the technology transfer is achieved most effectively by the Advisory Officers. Mass media are used more often in creating awareness, while the decision actually to adopt is often taken on the basis of trusted interpersonal contacts. This is precisely the aim of our extension service and the objective is achieved by developing personal conduct with the members, with a spirit of friend and guide philosophy, identification of time and region specific problems and their solutions.

The flow of technology in UPASI system is shown in Figure 1. From this it becomes evident that the Advisory Centres play a crucial role in the transfer of technology programme.

Fig.1 How research knowledge is transferred for utilisation


Research findings from UPASI-TRI
Provisional/ Specific Recommendations
Further testing by Advisory Services under different agroclimatic regions
Final recommendations
Implementation by the Tea Industry

Evidence :

The performance of any system is best judged by the results obtained. UPASI Tea Advisory Services are not an exception to this. The services rendered by these centres to the tea industry

---

* Dr. S.B.K. Murthy joined the TRI in 1989. Currently he is serving as Advisory Officer at Gudalur.

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are evident from the yield progression achieved by the tea districts over a period.

In order to improve and maintain the highest productivity in the tea districts, the local UPASI Advisory Officers play an important role in standardising certain cultural practices suitable for the region recommending them for implementation.

OTHER OBJECTIVES OF ADVISORY SERVICES :

1. Identification of field and factory problems that need attention of the Tea Research Institute.
2. Creation of data-base pertaining to the soil conditions, weather pattern, horizontal and vertical expansion, etc. for further research.
3. Analyses of soils for suggesting suitable amendments, if required.
4. Examination and identification of diseased specimens for suggesting remedial measures.
5. Conducting field trials under the guidance of UPASI-TRI to study the response of new recommendations under different agro-climatic zones.

All the extension activities are constantly and closely monitored by the concerned Advisory Officers which in turn are subject to periodical review by the UPASI Tea Research Institute. Based on the changing needs of the industry, the activities take shape suitably, to guide the tea plantations, face the challenges of the coming century. Thus, the UPASI Tea Advisory Services stand as a testimony to the progress achieved by the tea industry.

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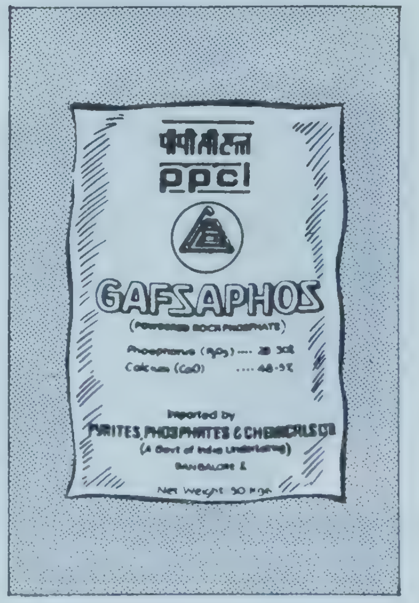

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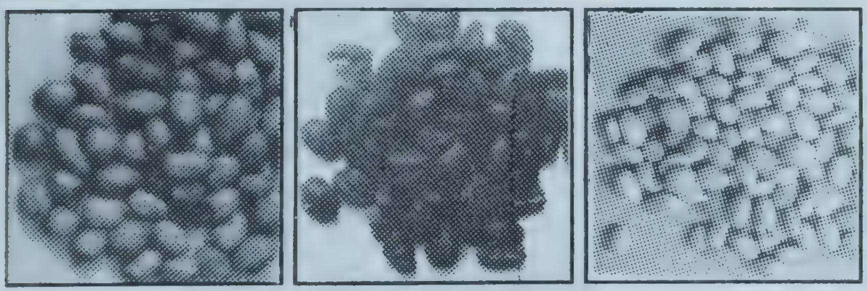

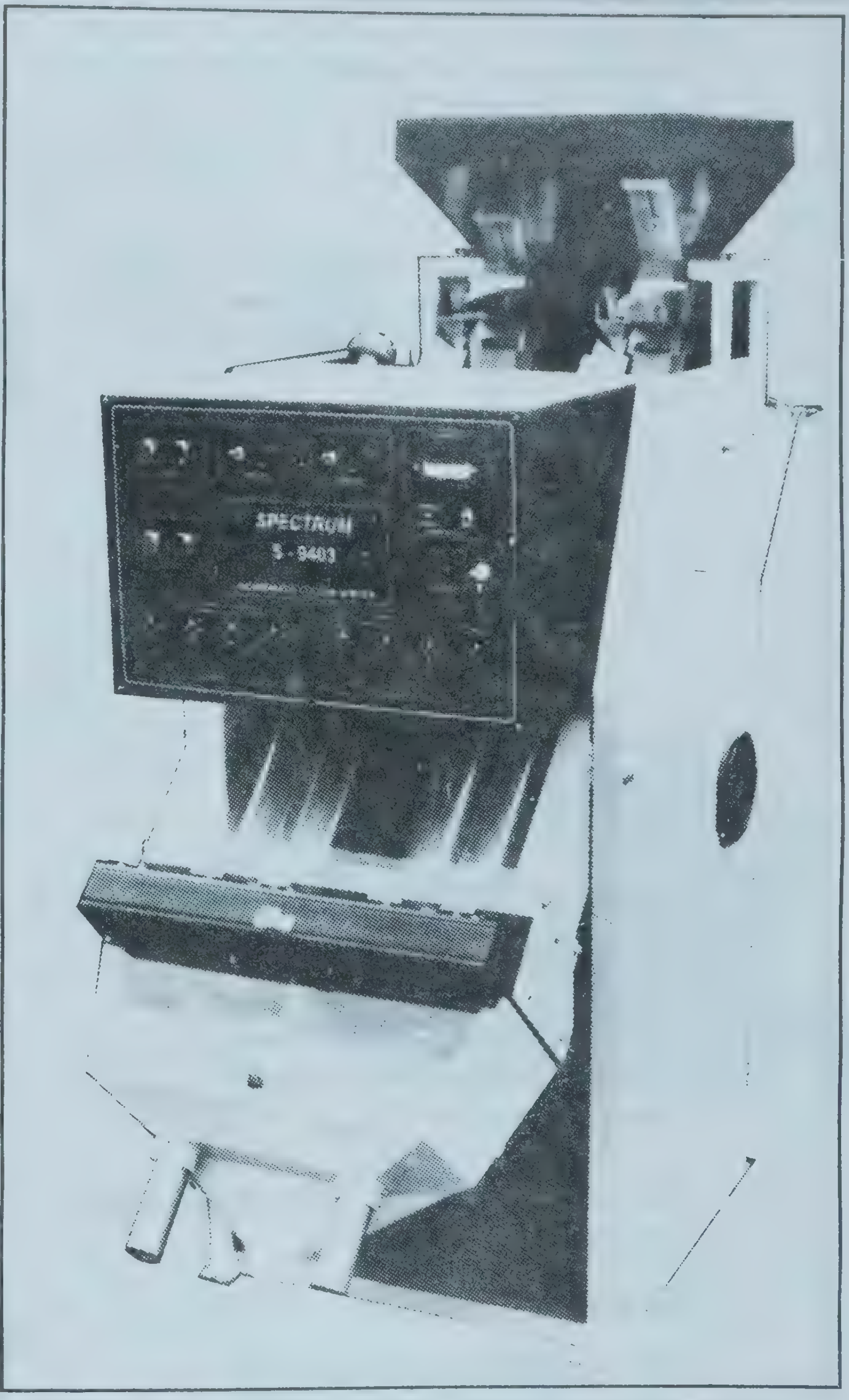

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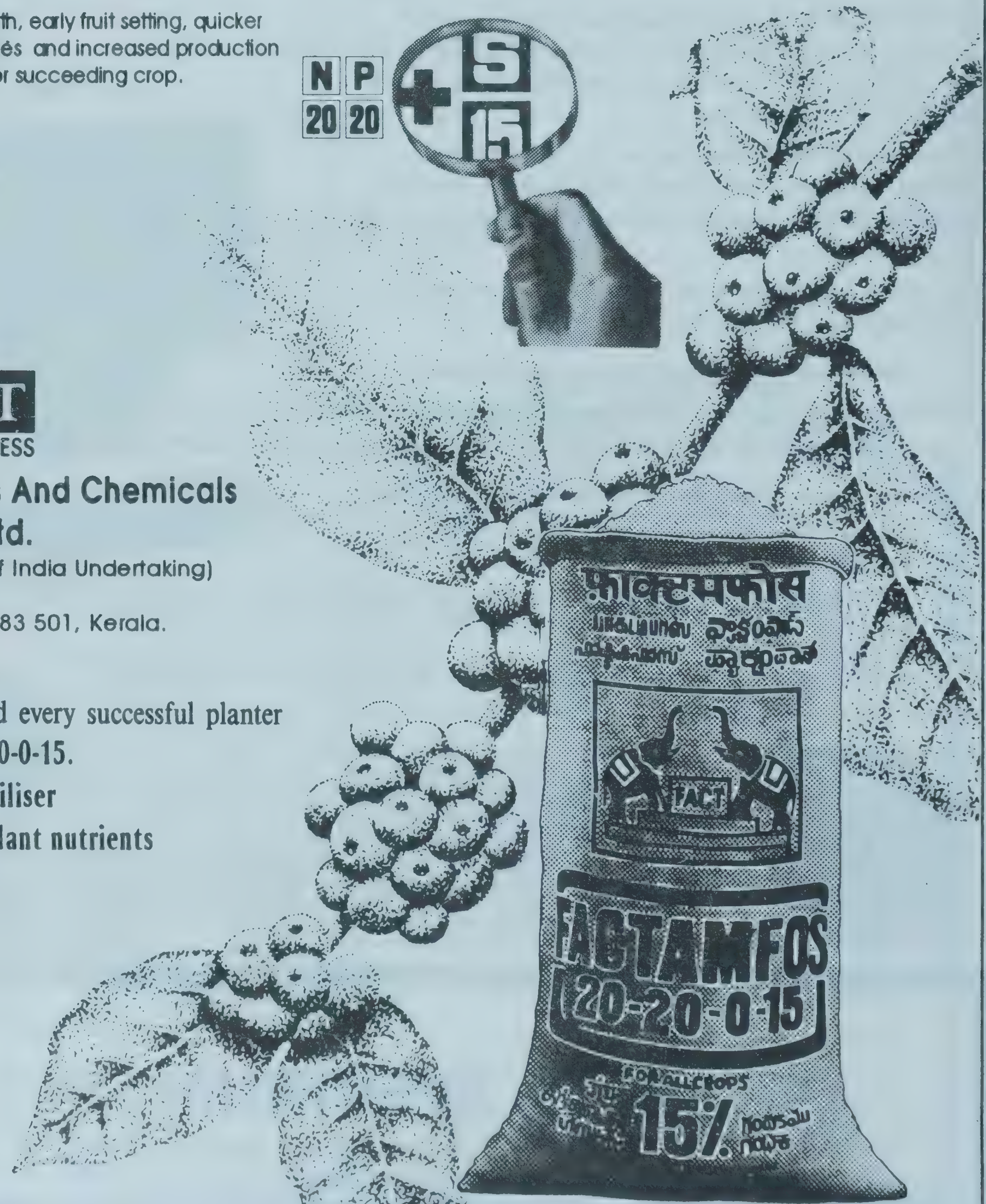

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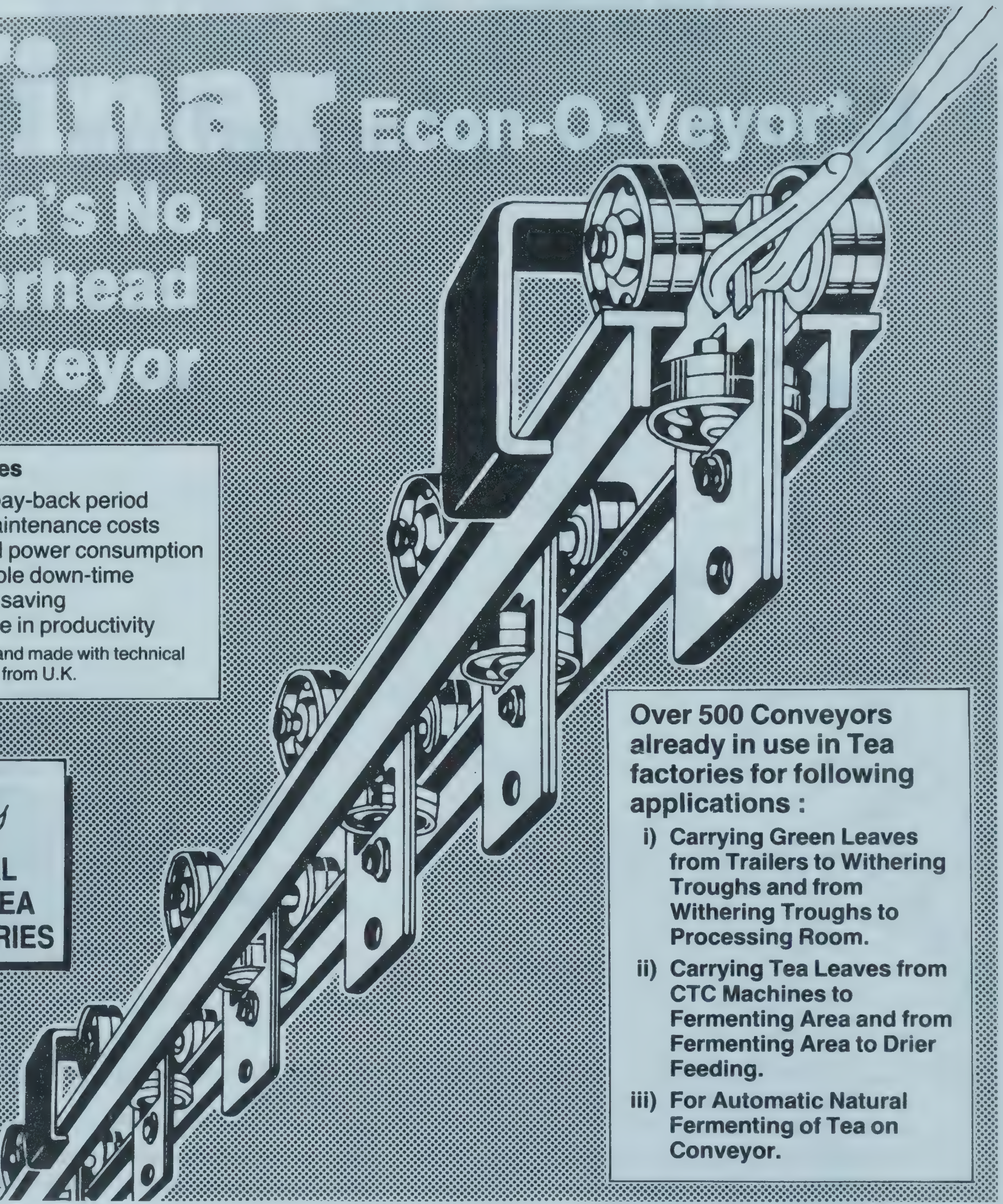

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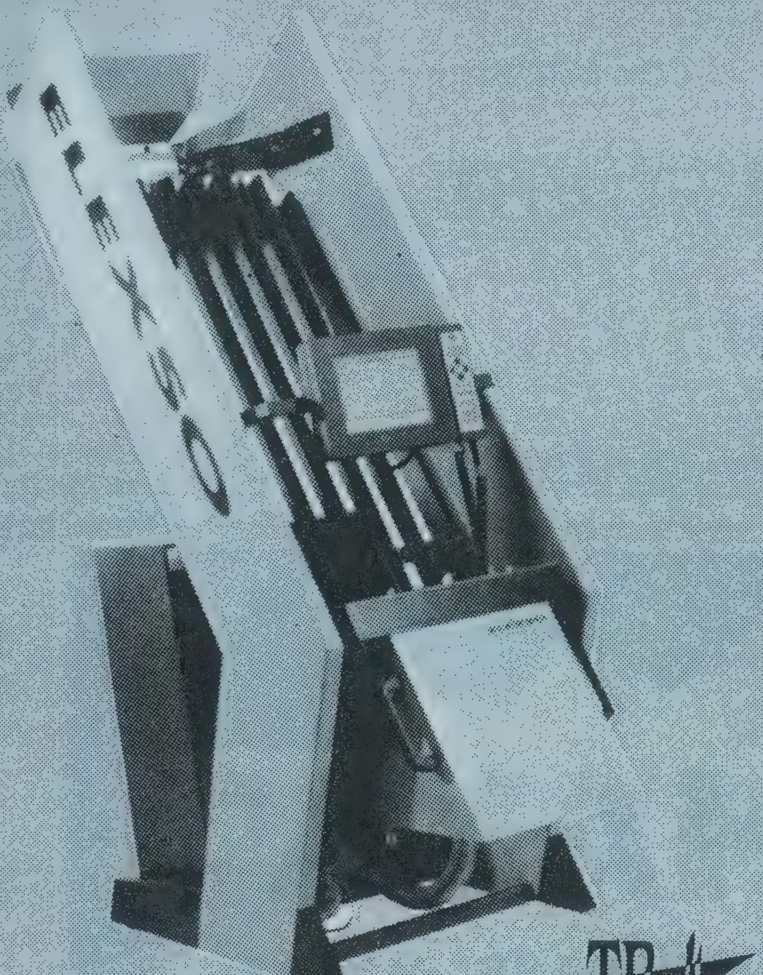

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UPASI ANNUAL CONFERENCE AND THEREAFTER

It is a treat to hear Mr. P. Chidambaram, Union Minister of State for Commerce. No ambiguity. After hearing the speech, everybody leaves the hall with full clarity on what the Government expects from the plantation industry and what the Government will do for the plantation industry. With his prodigious memory, Mr. Chidambaram is able to reel out statistics to support his contentions. Often, his view points may not be palatable; but they are unassailable both from the points of logic and rationality.

Rubber growers had a sigh of relief after hearing him. He said in UPASI and subsequently in Kottayam that rubber growth is a success story. That the barometer of domestic price will be in relation to international price. He also said that even if the domestic price is slightly higher than the international price, it is perfectly okay. In other words, the Bench Mark Price Scheme, which had the growers getting unremunerative prices, has been thrown out of the window. With good international prices prevailing during the last over a year, this announcement of the Minister is a boon to the rubber growers. Let us hope that the international price continues at the present level or goes up further. The Minister exhorted the rubber growers to increase production manifold to meet the country's requirement of over 7 lakh tonnes by 2000 A.D. and 12 lakh tonnes by 2010 A.D.

In regard to tea, the Minister was unequivocal. 1000 m.kg. production by 2000 A.D. This means 33 per cent increase from the current level. A tall order, indeed. From the high level of productivity South India has achieved, it is difficult to increase the productivity to much higher levels. There is very little extra land available. So what do we do.

a) There are still areas where productivity is much below the average. This has to go up.

b) Irrigation schemes have to be taken up so that the constraint of water availability in increasing production is removed.

c) We have to ask for subsidies from Government for drip irrigation.

Assuming all these steps increase production, there is a concomitant need to increase exports also, if the domestic price is to remain at satisfactory level. This means export thrust and quality improvement.

On coffee, the Minister did not mince his words. He was extremely critical of not pooling 30 per cent with Coffee Board by many of the coffee growers. Subsequent discussions with the Minister also indicated that on this count he is not likely to show any concession. The message was clear.

Not only he came down heavily on the States for having very high level of agricultural income tax, he also promised to intervene with the States on behalf of the plantation industry to reduce the tax level. This is good.

The targets for various crops as fixed below would indicate that there are exciting days ahead. Planters would have to put their collective brains in achieving these targets.

Crop	1994-95 (Actual)	2000 A.D. (Target)
	.... Tonnes	....
Tea	7,47,000	10,00,000
Coffee	1,80,000	3,00,000
Rubber	4,72,000	6,75,000

Cess is collected on tea, coffee, rubber and spices. UPASI was pleading at various fora for reducing or removing the cess levied. The Minister at subsequent meetings indicated that he is helpless in the matter. Cess is collected primarily to meet the expenditure of the Commodity Boards. Finance Minister is not agreeable to give grants to manage the Commodity Boards. Hence, the cess collection would continue.

Repeatedly at various platforms, the Minister had voiced his opinion that the plantation industry and also other industries must learn to live with international trading. Not merely on price levels, but on import and export also. In other words the policy approach of Government would be to allow international price for domestic producers, but at the same time allowing somewhat freer import and export. Yet, we have to learn that the Government has not fully taken to the path of market mechanism. Even when the domestic price remains at international level, if Government feels that weaker sections of the consumers should be given goods at affordable prices, Government may ask the industry to come forward. This is now happening in coffee. It happened in tea some time back. Some would argue that there is contradiction here. But any country which moves from controlled economy to market economy is bound to have some contradiction when the process of integration with world is taking place. ✪

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PRESIDENT'S ADDRESS

by

Mr. A. RAMESH RAO

at the 102nd UPASI Annual Conference held in Coonoor on September 12, 1995

UPASI has been speaking for the plantation industry for more than a century. We raise our crops and labour far away from Delhi and the public view. As planters, we have inherited a long tradition of producing for the export market. We cannot overlook the fact that this industry has to maintain the export role unimpaired in the national interest. The last 5 years have shown how international relations and world trade can undergo vital consequential changes. To take a measure of these changes and take advantage of them, is the task of an Association like UPASI. Instead of chasing events, we have to foresee and prepare for changes and play a role somewhat different from that of the past 50 years under a controlled economy.

The magnitude and complexity of changes we see here are such that we should maintain the closest contacts and consultations with the Government. We cannot cope with the long and rapid strides taking place abroad with mincing and trembling steps for want of assurances. We can set the pace of change, if we know that the Government understands us and thinks of working with us. The presence of the Head of the Ministry concerned with plantation affairs is an opportunity first to think and analyse on what the future holds and how we should prepare our way to cope with it.

On the economic outlook, the reforms sought to achieve the macro economic stabilisation and build on the strength that economy has acquired - such as

— high domestic savings,

— strong and matured private sector,

— vibrant capital market,

— large and diversified industry and self-sufficiency in agriculture.

The reforms are aimed at production increase, accelerating growth, improved production efficiency, innovation and international competitiveness and focussing Government resources on rural development and social sector.

Now India is perceptibly more open to the outside world. From a low level of 1 per cent industrial growth in 1991 we have achieved 8.5 per cent growth in 1994-95 and can justifiably be proud of the excellent productivity of our commodity crops.

India is the fifth largest economy in the world and the second largest amongst emerging developing economy – based on the purchasing power parity. In 1992-93, the G.D.P. was Rs. 6,279 billion at current price and according to the Reserve Bank of India, in 1994-95, the capital formation was Rs. 51,000 crores. When considering the economic development, it is important to note the major strength of the rural segments where most of the plantation crops are grown. It is estimated that the rural expenditure on the packaged goods is growing at the rate of 23 per cent per year.

Yet, there are areas of concern such as :

- savings have to go up for diverting funds for investment, as one cannot too much depend on the international capital flow.
- the inflation level needs to be brought down.
- economic reforms attempted from Delhi are only slowly percolating to the State level.
- the euphoria created on economic reforms, bestowing the benefits to the down-trodden and the slow trickling down could unleash pent up anger.
- unemployment remains stubbornly high.
- economic reforms would not create too many jobs in the initial years and when the number of unemployed runs to millions, their frustration could be exploited by those who are against economic reforms and this may be a danger.
- there is a need on the part of the industry and the business leaders to consider, on their own, the needs of those around them. It is a matter of pragmatism to recognise that islands of prosperity cannot survive for long in the midst of grinding poverty. It is economic inequality that creates social and political tensions, which in turn hamper economic growth.
- as stated by Dr. Manmohan Singh, "the objective of economic activity was to contribute to human happiness and it was only an integrated, contented and socially cohesive society that would help to realise the cherished national objective".

Plantation crops have been there for two centuries — the main trade item between the fast industrialising western countries and today's third world. The role could be as important in the next century. As the world market is moving in two directions and we have a strong interest in establishing our position in the community of plantation producers, we should have a strong linkage. We have seen various producing and trading interests forming compact regional federations or groups. We must look upon these developments not as threats but positive features enabling orderly debate on issues and transmission of vital information for the growth of trade and friendly relations. We have a vital interest in the Asian community of plantation crop producers. It may be advantageous to UPASI and other Associations to consider the scope of setting up of a Pan Asian Plantation Council to bring together the producers of Asian continent under a single umbrella.

We have to think and plan ahead of an enormous growth of the tropical commodity trade. To plan ahead is the path of wisdom and the Government of India, Commodity Boards and the State Governments concerned have a creative role to play and it is for the new Committee to consider the steps in this direction.

Malnad or the hill areas of peninsula have been the basic resource for the growth of various plantation crops. Since Independence, the industry which sustained the economy of all these hill areas have been severely taxed and its earnings disbursed in various ways leaving the hill area as poor as ever. The reversal of the process must have a high priority on our agenda. These hill areas are still backward, but have a tremendous promise of rapid development and a high level of production achievement. The important bottleneck has been the lack of infrastructure. The modern farm and management methods adopted by the planting community has got to be slowly passed on to the small farmers living in Malnad in improving the standards of their farm life and make this richly endowed hill areas as a pleasant place to live in and work to acquire a better life.

TEA

Interface between the plantation industry and Government at various fora has clearly brought out the concern of the Government at the declining tea export and also the industry wavering at the Government exhortatation that the tea production should go up to thousand million kgs. by 2000 AD.

Indian tea industry export right up to the early 1990 has been generally shaped by the bilateral trade protocol with the former USSR. With hindsight knowledge, one could say it was not wise to put more of the eggs in one basket. The export level was determined by the surplus over the domestic consumption. Competitive skill was not sharpened. Agreed, this has to change. Habits die hard. Yet, there are glimpses of market awareness amongst the planters on the need to explore new markets and recapture lost markets. The export level of South India tea industry was 27 per cent of the production last year as against the All India average of 23 per cent. But, this is not a comforting thought when one is confronted with the fact that Indian export has come down from 200 million kgs. to 150 million kgs.

The tea planting industry realises that export has to go up, and increasingly in value-added form. Quality, adherence to delivery schedule, regular supply, brand promotion etc., must be incorporated as our export culture. The concept of 'India Blend' does very well fit in with the scenario of an all-out efforts to increase exports.

Lack of availability of additional land for tea cultivation, productivity level almost reaching a plateau, depressed market prices and high tax rates not resulting in generation of resources for expansion etc., have hampered the upward production graph. Let me hasten to add that we are not advocating against production growth, but the 100 per cent increase in cuppage due to exhilarating shift from production of orthodox to CTC tea, etc. are vital factors while assessing the domestic consumption and the Government should into account these factors while fixing indicative targets.

Mr. A. Ramesh Rao, UPASI President, declaring open the Annual UPASI Exhibition.

Various schemes of the Tea Board had immensely benefitted the planting industry. Our request to the Hon'ble Minister is to enhance the quantum of assistance under these schemes, since these were fixed years back and are inadequate in the context of the level of inflation.

While on the subject of tea, I would like to pay rich deserving tributes to the Tea Board and in particular to Mr. Ahuja, Chairman of the Tea Board, for his guidance and ready assistance on tea research.

I would like to compliment the excellent work that is being done by the UPASI Tea Research Institute and its team of scientists and Advisory Officers. The production from the small growers segment in the South has reached a level of 40 million kgs. which is a certificate to the efforts of the determined and dynamic extension officers of KVK.

COFFEE BOARD

COFFEE

On the coffee front, while appreciating the Government's decision on our long pending plea in conceding 100 per cent FSQ to the small growers, the planting community feels that there has been inequity in granting only 70 per cent FSQ to the large growers. Unfortunately, there is a perception that this measure was partially responsible for the somewhat higher price level of coffee. I must submit that this is a mis-reading of the situation. One should realise that over two-thirds of coffee produced in India being exported, there is more perceptible price equilibrium in the Indian market and the world market. In any case, 30 per cent pooling by large growers is not the answer to contain the market prices to levels desired as fair by the Government. Further, there is inequality involved in giving full freedom in marketing to one set of producers and denying to the others. I fervently appeal to the Government to grant 100 per cent FSQ for all the crop produced. At this juncture, I would like to bring to the notice of the Hon'ble Minister that fruitful dialogue has been going on between the Coffee Board and the large growers on making available coffee at affordable price to the vulnerable sections of coffee drinkers, particularly in the South.

PLANTATION ACTS

The Plantation Acts are the instruments by which the Union Government has taken control of the plantation industry for its development. The income generated by the plantation industry is the main source of its development finance. Coffee is one of the most heavily taxed commodities in India. The imposition of 65 per cent as agricultural income tax by the State, even after the Central rate of Corporate tax has been brought down to 46 per cent shows the lack of fiscal principle. The dispersal of plantation income has its decisive effect on development and since the Union Government is vested with the control of the industry for his development, we submit that the Commerce Ministry can greatly help by bringing plantation tax under a comprehensive review by an independent body in whom the Government has confidence.

I also take this opportunity to bring to the notice of the Hon'ble Minister an important aspect of taxation of the income from agricultural commodities. In the case of tea, while the total income is assessed by the Centre, it is apportioned in the ratio of 40 : 60 for taxation between the Centre and the States. Consequent to the introduction of free marketing system in coffee, a new vista has been opened for the growers to go in for direct marketing in value added form. In this context, we request the Hon'ble Minister to recommend to the Finance Ministry to introduce a system for coffee on the lines of tea to apportion the income between agriculture and business.

The Government has always been interested in value added products and coffee converted into its instant or soluble form is one such value added product. In addition to Sales Tax on raw coffee, there is 30 per cent excise duty on the finished product and 15 per cent tax on the subsequent sale adding to over 50 per cent. Such harsh taxation cannot be mitigated by occasional gestures and repeated and diverse petitions for tax relief have become tiresome and ineffective.

NATURAL RUBBER

When the Rubber Board had identified 19,000 tonnes as deficit between production and consumption this year, there was hardly any justification to depart from the practice of only allowing imports of the deficit quantity. There was a spurt in prices for a few months, but is not the Government over reacting? Peak production season would start from this month and large scale import would lead to a crash in market price. The fact that most of the time domestic market price was in line with the world price cannot be overlooked.

Floor price of Rs. 24.90 per kg. announced by the Government in January 1994 was based on the cost of production of, say, mid 1993. Two years have passed since then and hence it is not fair for rubber consuming industry to compare the floor price fixed with the market price and allege high price level.

The withdrawal fo the fertiliser subsidy, the high inflationery level in the country, spiralling labour wages and the escalation in land prices have to be taken into account and due weightage should be given in fixing fair prices.

SPICES

It is heartening to note that the upswing in the production of cardamom has been maintained in 1994-95 too and I wish to congratulate the Spices Board for their research and developmental activities in this regard. I hope very soon India will regain its pre-eminent position as the number one producer of cardamom. Our productivity is still low and there is enormous scope to reach further heights in production and improve our exports which has stagnated. The introduction of grading of cardamom before auction and the insurance scheme for cardamom plantations are steps in the right direction.

Pepper production has practically stagnated during the course of last 5 years. Though exports improved during 1993-94, there was a set back in 1994-95. The only redeeming feature is the upswing in prices noticed especially since the second half of 1994. The quickwilt disease continues to affect a sizeable portion of the output and the Research Institutes have to come to the rescue of the growers on control measures.

I welcome the measures introduced by the Spices Board towards quality upgradation, package development and export promotion. The Board will be implementing a Rs. 3 crore scheme to provide financial assistance to spices growers' associations for setting up warehouses, processing and cleaning facilities towards giving greater care for post-harvesting technology.

PRICES

Let me not be hyprocritic. Coffee and rubber prices started well, have been coming down in the recent months in line with international trends. These growers were in the dumps for long years. The increase in return to the coffee grower was minimal for years together before the prices started improving in 1991-92. Simultaneously, the growth in market prices annually in natural rubber was less than 4 per cent between 1984 and 1994. Again if we take tea, the average price of South India tea went up by a more 3.3 per cent year between 1983 and 1994.

1,10,000 coffee growers hold less than 2 hectares of land. So is the case of rubber, where 8 lakh growers hold less than 2 hectares land each. In other words many of them are akin to marginal farmers. Are we not to look at the issue of price from the angle of who benefits? Had they been labelled farmers, the hue and cry against price rise would have been, I believe, more subdued. My submission is that please look at the issue at a larger canvas and also take into account the cycle nature of fortune of these crops. Let us also not over look the fact that the greatest beneficiary of the price increase has been the State Governments by way of mopping up Sales Tax and Agricultural Income Tax.

PLANTING INDUSTRY

The plantation industry is still shackled by many controls. Piling of regulatory laws in the last four decades has resulted in a fantastical dense jungle of regulation, that is in desparate need of sorting out.

There is a strong need for the deregulation and liberalisation of the various Plantation Commodity Acts and we believe that the Central Government is pursuing the same with vigour. We appeal to the Hon'ble Minister to use the good offices of the Central Government in persuading the State Governments to align with the Centre in the matter of deregulation and a common plantation policy.

INDUSTRIAL RELATIONS

The plantation industry has a good record of industrial relations and welfare. A wise man said that "we look for industrial peace; but we yearn for industrial harmony". It is a measure of maturity and pragmatism of the planters, unions, workers and bureaucrats responsible for industrial peace in the southern plantation industry. Dr. P.H. Daniel and many important union leaders of the three States have been chiefly responsible for these happy state of affairs.

The periodic settlements have become a ritual for announcement of wage increase and I think the time has come for an over-due warning that wage cannot go on rising without threat to the stability of the industry and jobs. Though the problem of rising wage expectations is recognised, the Government and the planting companies have not thought of systematically preparing their workers to understand the dangers of demanding wage rise without any rise in productivity. I am mentioning here that the findings of the latest World Bank Development Report is that "the countries where worker productivity has gone up faster than wage growth, had prospered faster than the countries where productivity growth has been slow".

KVK

The Prime Minister, speaking some time back, had said, "Much remains to be done in the areas such as health, promotion of women's welfare, problem of mass illiteracy, child care and the like. The corporate sector must assume much greater social responsibility than they have done in the past". And to us at UPASI it is a matter of satisfaction that the South Indian plantation industry through the UPASI-KVK has been involved in the upliftment of the poor and the tribal folk in the hilly areas.

The Indian Institute of Plantation Management has been functioning with full vigour at Bangalore and it is a matter of satisfaction that a decision has been taken finally to locate the Institute in Bangalore.

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CHIEF GUEST'S ADDRESS

by

Mr. P. CHIDAMBARAM

Union Minister of State for Commerce

I am delighted to be here after a gap of about four years most of which were spent usefully and productively. In the six months of my second spell in this Ministry, I have watched with growing pride and happiness the fortunes of the plantation industry, particularly coffee, tea, rubber and spices. UPASI is very central in our scheme of things and the reason is obvious. Apart from a little over 70 per cent of tea which is grown in North India, more correctly North Eastern part of India, all other plantation crops, the whole of our coffee, all of our rubber, and all of our spices are grown in South India. And, UPASI, 102 years old, represents millions of planters. In South India, more than that, it represents millions of families, including workers, their families. UPASI has come to occupy a very central place in our scheme of things as I said a little while ago and I look forward to working very closely with UPASI, learning from UPASI's experience, gaining from their insights and presiding over the changes that have to be introduced if the plantation industry must remain competitive and profitable in the years to come.

ERA OF CHANGE

We live in an era of change. Change does not come about usually, autonomously or voluntarily and when I say that, that is not the confession of guilt or admission of our weakness. I say that as a fact of life. Change comes about as a result of pressure, either pressure which develops due to internal causes or pressure which is felt as a result of environment.

I said this when I addressed you in September 1991. Change came about because, India, a huge nation of little over 900 million people, was virtually on the verge of an economic collapse. I still remember the days when Governor Venkitaramanan would carry a little slip of paper in his jacket pocket and fill it up and read to us alarming figures of depleting foreign exchange resources, in order to pressurise Government into moving forward quickly and taking decisive steps. We have come a long way. We are no longer on the verge of bankruptsy or economic collapse. We are no longer even tied to an aid programme or a loan programme of the IMF or the World Bank. Our gold is no longer in the vault of Bank of England. Indian industry is no longer in a recession. Indian exports are no longer in a decline. The current Governor of the Reserve Bank can play with dollors, he can buy and sell, a privilege denied to Mr. Venkitaramanan for most of his tenure.

How does this happen? It happened because we responded to change. We were willing to accept our failures — our collective failures. We were willing to take hard or difficult decisions. We were willing to communicate with our people and explain to them why these decisions were necessary. The message was not wrong, to the lack of communications skill, which was the cause of set backs. But today, all over India, there is a sense of satisfaction that India is being pulled back from the brink of a catastrophy and we are on the way to become, what President Ramesh Rao said, the fourth largest economy in the world by the turn of the century. That gives me pride; that makes me taller; that gives me the strength to stand up in any world forum of business men, of political leaders. Look my interlocution of the eye and tell them India, India's economy, would emerge as the fourth largest economy in the world and we will be a major player in any world forum in export frontiers.

These changes have not been brought about by Government alone. These changes have been brought about by industries, by business, by trade, by our farmers, by our planters, all working tirelessly facing heavy odds and producing more and producing more efficiently to build India's muscles and scions. Industry today is growing at a clipping rate of over 8.5 per cent. Exports are at an all time high. The last six months, and particularly in the last four months, the aggregated figures are available. Exports have grown by 30 per cent in dollor terms. India's reserve is at an all time high of 20 billion dollors. India's GDP will go up this year by 6 per cent. India's share of world trade has increased from 0.4 per cent to 0.6 per cent and is expected to reach 1 per cent by the year 2000.

SETTING HIGH GOALS

India today has gained greatly and is respected in the comity of nations. Just yesterday India was elected Co-chairman along with canada, in the drafting committee in the World Women's Conference. You and I belong to a great nation. We were great 5000 years ago, we great 2000 years ago. Many parts of India were lively throbbing with flourishing economies even 500 years ago. At the turn of the century, India was one of the major trading nations. And we can become a great nation once again. But that will require setting for ourselves high goals, almost unattainable goals, and yet go that extra miles to reach that what seems to be an unattainable goal. We must believe in ourselves that we can build India and make it a great nation.

In the last two years, the plantation industry has done remarkably well. The sense of pride could be discerned through the speech of President, Mr. Ramesh Rao, but I will respond to many of his concerns even when I state the areas of my concern. The industry has done well. Industry has done well because we have carried liberalisation into the plantation industry and generally speaking, the industry has responded well to the policy signals that emnate from Delhi and elsewhere realising that liberalisation is a process which has to be carried forward every day, every month, every year until all the unreformed sectors of India's economy are truly liberalised reformed if I may say liberated.

SMALL GROWERS

The plantation industry and planters generally, contrary to popular perception, are essentially small growers. Whenever I sit down to review or formulate the policy, I keep this in my mind. It is essentially an area of economic activity which is dominated by small peoples, small growers. It might not be quite reflected on this audience. But the fact is they are small growers. 98 per cent of all who grow coffee have 2 hectares or less. 98 per cent of all grow rubber have 2 hectares or less. And in spices, it is about the same; almost 90 per cent have 2 hectares or less. They are small peoples with small holdings, little reserves, little capacity to wither a year or two of misfortune, little savings, limited capacity to reinvest, but the enormous commonsense to absorb new technology, new ideas and improved productivity.

Productivity increases in coffee, in rubber and to some extent in tea could not have happened but for small grower being in a position to absorb the advances of technology and advances of better agricultural practices. I pay tribute today to the small grower in tea, in coffee, in rubber and spices who has built this plantation industry and has placed it today at a position which you find yourself today.

This small grower required freedom. It is true that the Plantation Acts, many of them several decades old, were made at a time when the British wished to control the industry and appropriate the produce. Today, there is no one to appropriate your produce. Let me make that very clear. Today we want you to produce both for the domestic economy as well as for exports. We want you to produce enough so that the people of this country can have tea, can have coffee or industries can have enough rubber and then we can have a surplus to export tea, coffee and spices and soon some rubber. And I shall spell out some of these ideas presently.

DUAL APPROACH

Four years ago I cautioned you that we must abandon the outmoded and irrelevant philosophy that we have followed so far. Produce what you can, consume what you wish and export what remains. I am glad you have abandoned that. Today you have to produce for the domestic market and you have also to produce for the export market. It may be that both require a common approach. But it is also quite possible that both may require different approaches. To produce for the domestic market and sell in the domestic market may require one kind of approach whereas producing and targetting the export market may require a very different kind of approach, as Mr. Bhasin and his colleagues in the Indian Tea Association have learnt in the last couple of years. Therefore, while I pay tribute to the small growers, I also wish to send a clear message to the plantation community of India that we must keep these two markets in focus. And all our policies, all our practices, all our laws including our taxation laws to which I would make reference presently must be geared to producing enough for the domestic market and producing what is required for the export market.

UPASI
INDUSTRIAL EXHIBITION

TEA

Let me take each commodity and deal with it briefly. Firstly, tea. I am glad that after many years, President Ramesh Rao has acknowledged in a forum as distinguished as UPASI that our dependency on one market proved almost fatal. 40 to 50 per cent of our tea was going to erstwhile Soviet market. When that collapsed, the bottom of the tea industry collapsed. In his speech Mr. Ramesh Rao also acknowledged the changes that are coming about in tea marketing. I just wish to make a few points. Firstly, there is no change and there will be no change or dilution in the target that we must achieve 1000 million kgs per year by 2000. I know that in every meeting I am assailed with arguments why we should revise our targets. At every meeting I resist such an assault. I shall be so today too. We must work to attain our target of 1000 million kgs by the year 2000. This will require raising productivity from the current level of approximately 1750 kgs to about 1800 or 1850 kgs or even 2000 kgs and bringing more land under cultivation. It will require enhancing replanting from the present pitable level of 0.4 per cent to atleast 1per cent, if not the target of 2 per cent. It will require better water management and irrigation.

NEW MARKETS

It will require finding new markets for exports so that prices remain remunerative for the farmer. It will require switching over from leaf tea to tea bags. It will require a thrust to the new idea of the India Blend, an effort in which I am told 17 companies in North India have pooled their resources. It will require making Darjeeling tea, a niche product, a premium product, and finding niche market for that product. All this can be done and I promise you that within the resources available in the Ministry and the Government, we shall attempt to do everyone of the things that I have set out and I seek your cooperation in doing all these things in order to achieve our target of 1000 million kgs.

Consumption in India is growing at the rate of 4 per cent in a year and that is when our economy is growing at 5.5 per cent. But when the economy grows at 6 or 6.5 per cent, consumption is bound to grow at a faster rate. In fact, I am told tea production this year is only about 735 or 740 million kgs. And nearly 600 or 620 million kgs are consumed within India. It will leave you a very little surplus. Unless production keeps pace with consumption growth, there will be hardly any exportable surplus in five years. It is a matter of simple arithmetic. If 620 million kgs of domestic consumption grows at 4 per cent a year and 750 million kgs of production remains stagnant, it doesn't require one of our distinguished scientists to tell us that in the year 2000 we will have to import tea. That is unacceptable and that is why I appeal to you, President Ramesh Rao, President - elect Samuel, Chairman of ITA Bhasin, to join me in our campaign, to achieve 1000 million kgs by the year 2000 and then continue from there to increase both production and productivity. This year, production has been so far about 33 million kgs less than last year. Although we are no longer dependent on a single market and efforts are made to recapture the lost markets, we must improve production and we must find new markets. Tea export to

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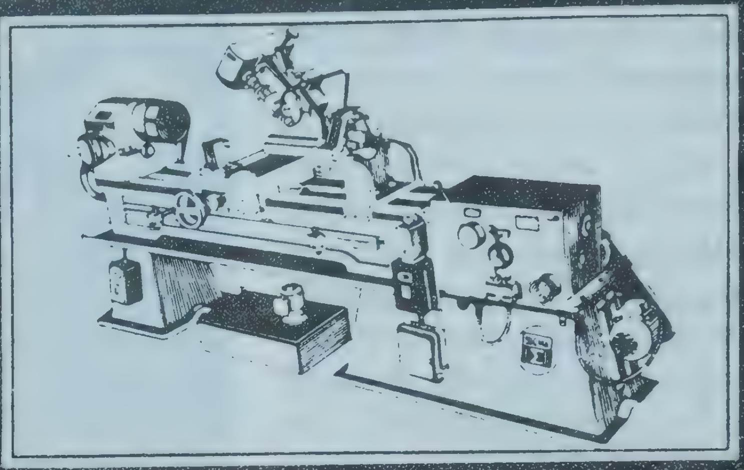

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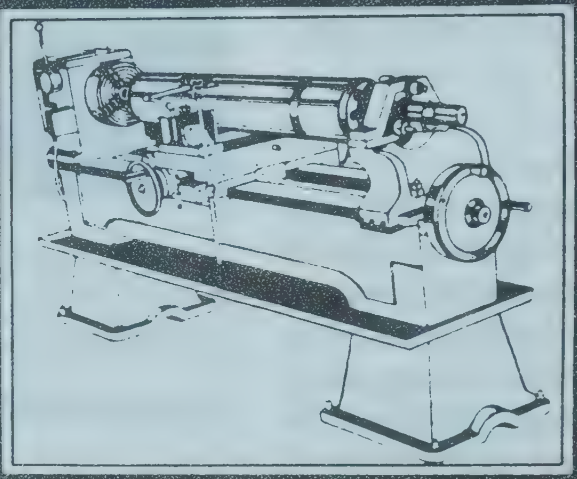

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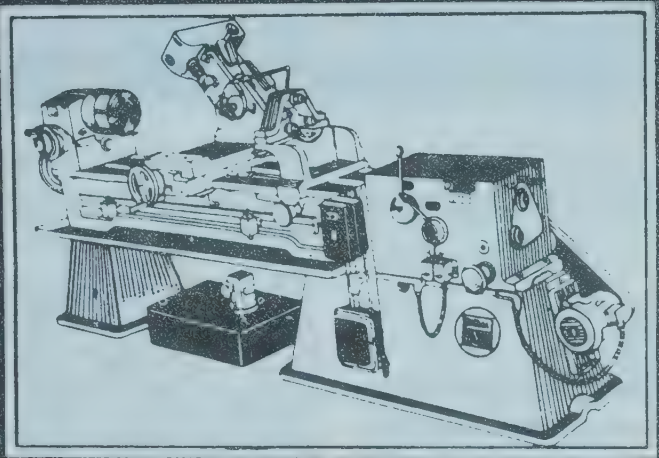

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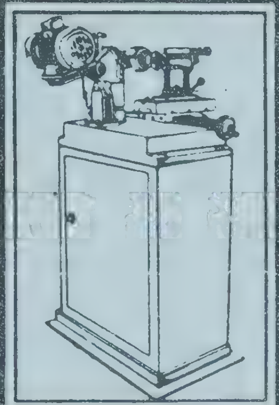

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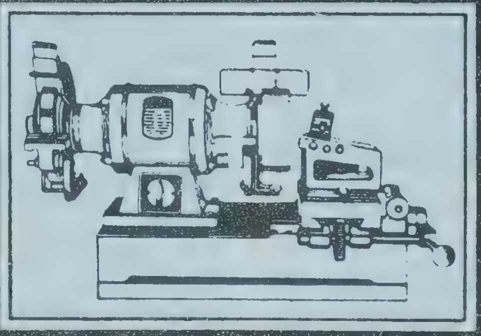

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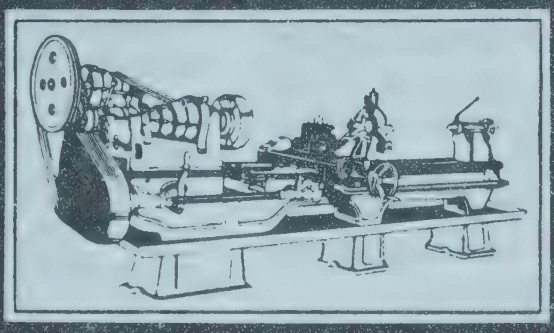

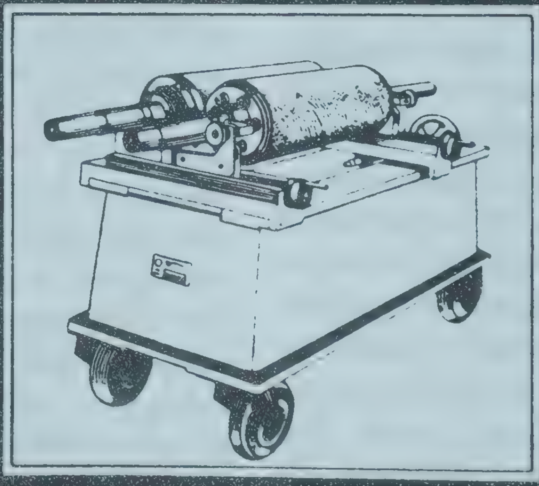

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countries of the former Soviet Union improved this year as against last year. Last year in the corresponding period we were able to export only 7.11 million kgs, but so far this year we exported 17.40 million kgs and I am confident that we will be able to recapture some of the lost markets.

There is a problem of taxation in tea. My predecessor and I have taken this upto the Finance Minister. I believe that it is not possible to solve this problem without an amendment to the Income Tax Act and Income Tax Rules. Rule 8 is a stumbling block. I am aware of the problem. I intend to take up the matter vigorously with the Finance Minister. We must find a way in which tea exporters enjoy the same advantage of Section 80 HHC as any other exporter. It is inequitable even it is not illegal, but surely what is inequitable to my mind deserves to be redressed as much as what is illegal deserves to be redressed.

COFFEE

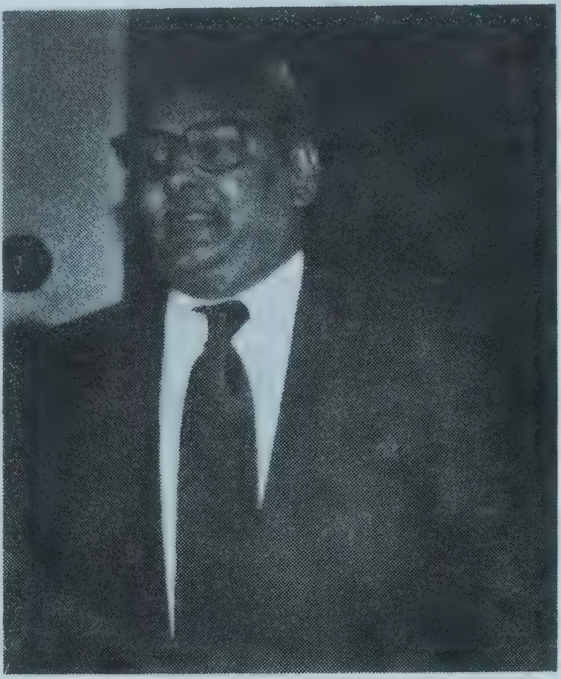
I turn to coffee. In coffee again, while I applaud all of you who have worked hard for your prosperity this year, I have two constituencies to address. One is the very distinguished audience of this UPASI hall. The other is the millions of homes in South India who consume coffee. And many distinguished representatives (press) are seated here. And they will have to carry the message back to the people and I have to tell them why coffee costs today Rs. 160 a kilogram? Why instant coffee costs Rs. 800 a kilogram? Why is coffee not available to the Indian home which drinks coffee, which likes to drink coffee. Production this year is expected to be an all time high of almost 2,25,000 M.T. But that comes out of 2,50,000 hectares, implying a productivity of only 900 kilograms per hectare. Coffee Board tells me they have discovered varieties of coffee which can yield two and half tonnes per hectare. So 2,50,000 hectares should 6,25,000 tonnes. Yet it yields only 2,25,000 tonnes. We have not gone back on our promises to liberalise coffee, from what they thought the clutches of the Coffee Board. They are happy. The Coffee Board is obviously unhappy. I would be happy if my other constituency is given coffee at a reasonable price. President Ramesh Rao asked me whether is it not unfair that you ask large growers to pool 30 per cent of their coffee. I ask him is it not unfair that you disobey the law? I propose 30 per cent pooling. You dispose it off by shrugging your shoulder. Let us come to a reasonable arrangement as between gentlemen. There is no way in which there will be further liberalisation of the pooling arrangement, unless coffee growers come to an arrangement with Coffee Board to give to the Coffee Board a certain quantity of coffee for market intervention. I can't say that in plainer words, I can't be blunt because I am your guest. But before the month is over, President Ramesh Rao, President-elect Samuel and Chairman, Coffee Board, will have to produce an aggrement by which coffee growers will give up about 20,000 tonnes coffee, which represents less than 10 per cent of the total production, for market intervention. My knowledge of law is rusty. But I am told from very reliable sources that the Coffee Board Chairman has been consulting lawyers. It is another danger. I should caution you.

Just like tea became dependent on a single market, coffee exports are becoming dependent on four markets. Most of you may not be aware of that. Germany, Italy and Russia account for 50 per cent of all coffee exports. If you add USA it will be 60 per cent of all coffee exports. That is not a good sign. You must find new markets. We will help you find new markets, but the initiative must come from you. Let us not fall into the same trap that we fell into in tea. Let us go out and find new markets for coffee. This year, the price of realisation of coffee, on an average, has been over a lakh of rupees per tonne. That is good. For many many years coffee growers did not have any surpluses; did not have any money to reinvest. This year you have the money. I will urge you to invest.

The berry borer problem is fully within my knowledge. There is no cause for alarm. The indicator affected area of about 39,000 hectares does not mean that all 39,000 hectares is affected. It only means that only part is affected. There is a policy which declare the whole village or the whole estate is affected. I am told that Coffee Board is working on measures and now it is in possible to control the berry borer disease. When I tour Chikmagalur, Hunsur, Hassan, Coorg and Mercara on the 17th and 18th of this month I will meet many of you there and look forward to meeting you there. We will talk, we will spend long hours talking about what we need to do to support and help the coffee grower who has put a remarkable performance in the last few years.

RUBBER

I turn to rubber. Rubber has been our success story. With the highest productivity in the world, production has grown by leaps and bounds, consumption has grown at an even faster rate at a rate which left the Rubber Board little perplexed. But it did not sharpen its arithmetical skills. And Rubber Board came to the conclusion that there was only a decifit of 19,000 M.T. about which UPASI President made a reference. We have allowed to import 38,450 M.T. of rubber. The idea was not to cause an injury to the rubber growers in India and I am fully conscious that 98 per cent of them are small growers. The idea was to send the message that, hereafter, rubber, whose exports are on OGL, whose imports are on SIL, will have to be treated as an internationally traded commodity. And its price will have to be benchmarked to international prices. There is no more merits, there is no more words in the price that we announced from time to time called a Bench Mark Price. And the last time we did it was in February 1994 and fixed it up with the ridiculous figure of Rs. 24.90. It is irrelevant. In my first spell in this Ministry, people constantly pleaded with me to ensure that they got the Bench Mark price. Today nobody even remembers that there is a Bench Mark Price of Rs. 24.90. Yesterday's price was Rs. 42.50. And that is being the price for the last twelve months. I measure my year, by twelve months in a year. The last time I looked at the figures was that since February this year, Indian rubber prices had been higher than international rubber prices and in fact almost in five months, we were way out of international rubber prices. I don't grudge the fact that Indian rubber growers have earned good price. Please understand rubber is an internationally traded commodity. Its price in India would have to be tuned according to international prices, because rubber is an industrial raw material. There are thousands and thousands of downstream industries which are dependent on rubber. And thousands of workers are dependent on those industries. As long as rubber prices in India reflect international prices, Govt. will not interfere in the matter. We were extremely careful in calibrating the extended imports. We rejected the Rubber Board's conclusion that 19,000 tonnes was the deficit. That was a simple arithmetical difference between production and consumption ignoring the fact of 55 per cent of rubber was produced in the month of September and January and there is a decline from February to August. While consumption remains at a straight line, production does not follow a straight line and you add the requirement of buffer stock which has an influence on prices. And this has been empirically established by data analysed by Indian Statistical Institute and the NCAER that we will have to work out a better model for deciding the level of imports and the decision that we took this year to import 50,000 tonnes of rubber, which was not implemented; eventually import of only 38,450 M.T. was the correct decision.



Mr. S. Samuel, Vice President, UPASI, proposing the vote of thanks.

With that decision and phasing of that decision, it brought about some stability in price market in rubber and I am confident that the measures have been good, I repeat today, we will ensure that Indian rubber fetches a price reflected in International price. And we will not allow the Indian rubber grower to suffer as a result of imports.

SPICES

There is some anxiety about the cess on spices which has been suspended upto 30th September. I have taken note of your concern and what needs to be done will be done.

On cardamom there is a very serious problem. Productivity of cardamom in India is only 62 kilograms per hectare whereas rival Guatemala it is 200 kilogram per hectare. Indian cardamom has been priced out of the market. Cardamom growers met me and given me some suggestions. They are under serious examination. We will find ways and means with which we can support the cardamom growers, again the very small growers. We need to ensure that atleast 1,500 M.T. of cardamom is exported every year in order to bring about some kind of price stability. But how we are going to do it? I am not quite clear yet. But we will find the ways and means with which we can ensure that a certain quantity of cardamom is exported at reasonable price in order to ensure price stability in India.

TAXATION

Finally, I want to touch upon the vexed question of taxation. I am glad that the accusing finger is now pointed at the State Governments. We have done all that we need to do for Income tax assessees. Thanks to Mr. Venkitaramanan and others who were advising us at that time to bring down the Income tax to

40 per cent. Yet State after State continues to squeeze the last drop of juice from the agricultural sector. So, perhaps next year, you should invite collectively all the Chief Ministers of the States to your UPASI Conference. In fact, you have not done so for many years. You continue to regard yourself as neglected children of the Centre, without realising the fact that you have been orphaned by the State Governments. Take the State of Karnataka. It imposes a purchase tax on coffee sold to the Coffee Board alone. Who will sell to the Coffee Board? You know that. So you don't sell it to the Coffee Board. I have taken this matter with the Chief Minister of Karnataka and I look forward to meeting him in the next few days. This is unjust. This is inequitable. Take for example, agricultural income tax. I have written to all the Chief Ministers.

On tea, in Assam it starts with 52 per cent upto one lakh and goes upto 60 per cent. In West Bengal, which obviously wants to ensure that the prosperity of the small tea growers is taxed to meet some ideological standard, the tax upto one lakh is 65 per cent and goes upto 70 per cent. Tamilnadu and Kerala are more reasonable. Upto one lakh the tax is only 50 per cent and then it goes upto 65 per cent. In Karnataka the effective tax rate is 37.5 per cent upto one lakh and then it raises sharply. You must raise your collective voice against the State Governments in the Southern States where all the plantation crops are produced, except tea which is also produced in Bengal and Assam. This kind of taxation is retrograde. This kind of taxation robs the planter of his savings and worse, this kind of taxation leaves little for investment. What was the problem with Central Income Tax? Central Income Tax left little legitimate savings in the hands of the producer to be invested. And, therefore, generated a large amount of black money which could only be invested in certain kinds of enterprises. Less said about it is the better.

HIGH POWER COMMITTEE

When income tax is reduced at the Centre, it leaves behind in the hands of the producer, larger reserve which he invests, if I want more land to come under tea, if I want more value-added tea to be produced. If I want coffee plantations to reinvest, in better management practices, I want them to adopt better curing practices. I want them to adopt new variety. If I want the rubber grower to adopt new clone varieties which are produced by the Rubber Research Institute, I must leave enough money in his hand. If there is not enough money in his hand what will he invest? What the States are doing is taking away money from the producer's hands. And spending it as we all know inefficiently. The State is the most inefficient spender of money. We know that; Just look at the quality of the roads the States made. The quality of water it supplies. I, therefore, appeal to all the Chief Ministers of the States, particularly the Southern States as well as the Chief Ministers of Bengal and Assam to take a look at the agricultural taxation policy. Reduce taxes; leave more money in the hands of small growers. Leave more money in the hands of planters. So, that money can be reinvested for more growth, for more jobs, for more production. I accept in principle the suggestion made by President Ramesh Rao that a High Power Committee should look at Plantation taxes. But I can't implement this unless I have the willing co-operation of the States. But I should do my best to ensure to win the cooperation of the States to see whether we can do something for the plantation industry.

The story of sales tax is no different. Sales tax varies from 2 per cent in Assam, 4 per cent in Bengal to 5 per cent in Tamilnadu, and there is an additional sales tax to a 7 per cent purchase tax on sales to Coffee Board in Karnataka to 7 per cent in Kerala. So between agricultural income tax and sales tax, and all other unmentionable illegal extractions which are part of the revenue collection system in India, what does it leave the producer with? If change has to come about in the industry, the producer must be left with money in his hands. I have no doubt in my mind, but the citizen of India left with money is a wiser, more prudent, more dependable, spender of that money for productive purposes, than any Government, Centre or State.

That is the philosophy behind reduction of taxes, customs duties, income taxes, wealth taxes, abolition of estate duty. The State can't appropriate the citizen's earnings. The State must become leaner and smaller, it must spend less. If it does not have money to spend it is better it does not spend at all. I want to take this opportunity to assure you that I am fully committed to reduction of taxes in the plantation sector and I can do my best to ensure that these taxes are reduced with more money saved.

Thank you very much for giving me this opportunity to be here today at your 102nd Annual Session and I wish you another year of greater production, greater productivity, prosperity — prosperity which I know you will share with the workers, their families and the people of the respective States. ✪

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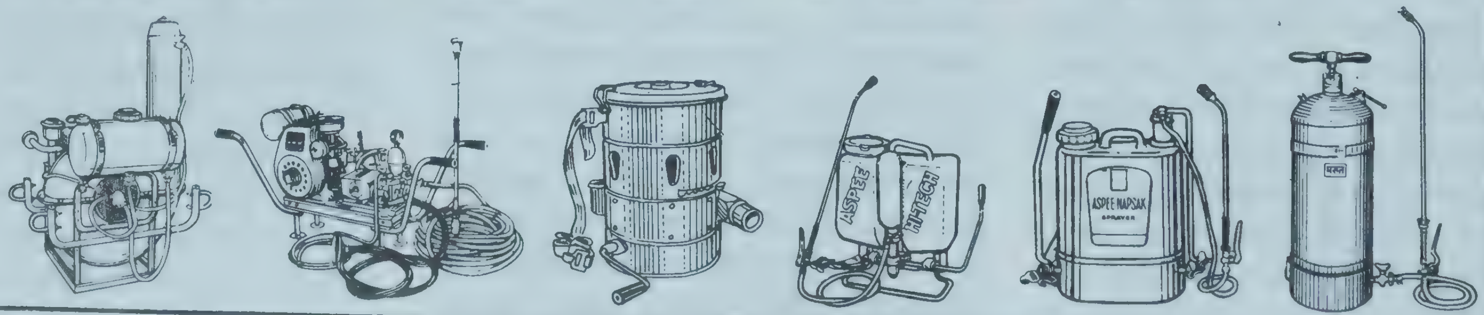

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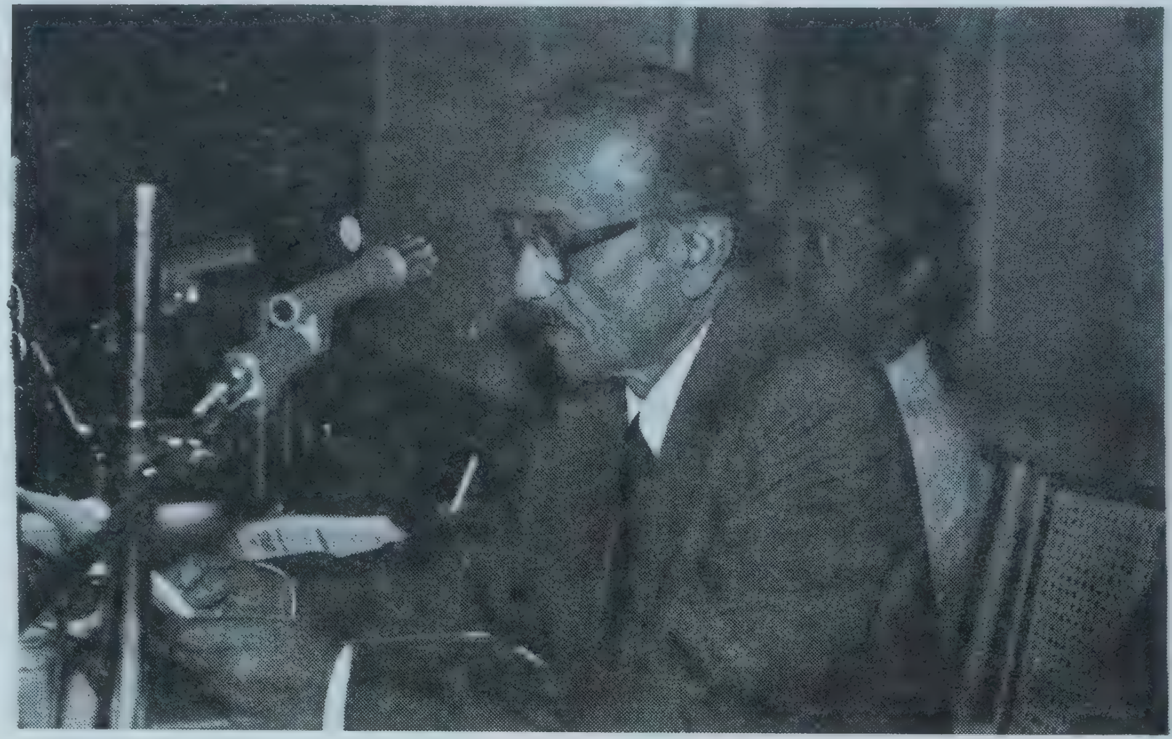
PERSPECTIVES OF COFFEE RESEARCH-VIEWS OF THE COFFEE INDUSTRY

By K.A. AYAPPA*

In the long history of coffee after the establishment of plantations, coffee breeding in India for the past 70 years has made significant contributions to the coffee industry.

Breeding for higher productivity, pest and disease resistance, quality and cost aspects of Indian coffees, which has to encompass total management from the tree to the cup being the main objectives.



I would like to briefly recall the history of coffee growing in India and, in particular, the trials and disappointments of the growers over the years to establish themselves firmly as one of the premier coffee growing country, though its share is only 3 per cent of the world production and 2 to 2.3 per cent of the global exports.

The province of Kaffa in Ethiopia is considered to be the original habitat of Arabica coffee and Central Africa is the home of Robusta.

PESTS AND DISEASES

We have come a long way since Baba Budan brought seven seeds from Yemen during 1600 A.D. and raised seedlings in the Baba Budan Giri hills of Chikmagalur. However, it was not until the late 1820's that commercial plantations were opened in South India with British enterprise and investment. Coffee cultivation reached its peak during 1860's. This period also witnessed major outbreaks of pests and diseases and which are still continuing to be a major problem for commercial cultivation of coffee and in particular the Arabica Genotypes. The white Stem Borer (*xylotrechus quadripes*) posed a major threat to Indian coffee in 1863.

Leaf Rust (*Hemileia Vastatrix*) was first observed in epidemic scale in 1869. Subsequent years saw a decline due to the ravages of these pests and diseases.

Marginal estates were abandoned. The flourishing coffee industry in Sri Lanka was also given up.

The first rust tolerant Arabica selection was the Coorgs developed in 1870. This selection soon become susceptible to 21 races of Rust. Then came the kents which many of us here are very familiar with, and is still in existence in some of the coffee growing areas. This is again susceptible to 11 races of Leaf Rust.

It will be of great interest to you that in 1893, the UPASI had

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* Craigmore Estate, Pollibetta.

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organised to tackle the various problems of the coffee industry which was on the decline. Experiments on spraying was started as early as 1914 against Leaf Rust and Black Rot in Pollibetta.

The efforts of Dr. L.C. Coleman led to the establishment of a coffee experimental station at Balehonnur in the year 1925 with the primary object of breeding Rust resistant selections and control of other pests and diseases.

In 1931, W.W. Mayna, the first coffee scientific officer of UPASI, discovered the existence of 4 physiological races of Leaf Rust (*Hemileia Vastatrix*). The Coffee Board took over the coffee experimental station at Balehonnur in 1946 to establish the Central Coffee Research Institute.

This institute is supported by sub stations and Regional Coffee Research Stations in all the coffee growing States. The extension wing was organised in 1950 and is now well established and within easy reach of the coffee growers.

While we are anxious to hear from Dr. R. Naidu, Director, CCRI, the latest R & D findings on coffee, I would like to place a few day to day problems facing the growers in the field with particular reference to the genotypes introduced from time to time for commercial cultivation.

Mr. I.J.J. Rebello, Chairman, UPASI Coffee Committee making his welcome-cum-Opening Remarks at the Research Session on Coffee held on 11th September 1995, coinciding with the 102nd UPASI Annual Conference. Others : (L-R) Mr. K. Sreedharan, Head, Division of Entomology, CCRI, Mr. K.A. Ayappa and Dr. R. Naidu, Director, CCRI.

PERENNIAL CROP

Coffee being a perennial crop, replacement of existing genotypes with improved material is a gradual and slow process.

There has always been a keen awareness among the planting community for intensive cultivation of coffee and growers are always on the look out for newer genotypes being released form CCRI for the improvement of their plantations.

ALL IN ONE

Even at depressed coffee prices, this trend had not shown any marked decline though constraints like working capital did have its effect on other developments of the plantations.

A Scientist once asked a coffee planter "what type of coffee plant do you expect us to produce for your plantations?". The planter promptly replied "give us a plant which is resistant to Leaf Rust, Black Rot, and Brown Eyespot. Resistant to Stem Borer, Shot Hold Borer & Berry Borer. The plant should be a Dwarf or Semi Dwarf in growth and produce a minimum 2½ tonne of coffee per hectare every year. The coffee to have the qualities of the Colombian and Kenyan coffees and an economic life span of at least 30 years." The scientist looked at the planter from head to foot and told him "Dear friend, while thanking you for your wonderful suggestion; I will see you only after 5 years."

As mentioned earlier, coffee being a perennial crop, replacement of existing genotypes is a gradual process.

So far 12 Arabicas and three Robusta selections have been released for commercial cultivation by the coffee research group.

The Arabica station selection S-795 was released during 1940. This was the first step towards the large scale introduction of Rust resistant types to the plantations. To date, more than 90 per cent to 95 per cent of Arabica plantations have been planted with station selections. Further improvements in the Rust resistance factor was evident by the release of other selections : SLN. 5, SLN. 6, SLN. 8 — (Hybrido-de-Timor). A Highly Rust resistant spontaneous hybrid of Robusta and Arabica from Portuguese SLN. 9 and cauvery/catimore genotypes.

In Robusta S-274 and Congensis x Robusta hybrids.

The above Arabica selections were released for their variable degrees of resistance to Rust. This fungal infection continues to be of great concern in all the Arabica growing areas - around the world.

Out of the 30 races recorded 14 races have so far been identified in India. The cultivation of wide variety of Rust resistant Genotypes in India has induced the pathogen to mutate to new races and capable of infecting the plants which had shown high resistance to Rust for many years.

A criticial assessment of the results of plant breeding for rust resistance alone will show that ever since the large scale introduction of S. 795 for commercial cultivation in 1940, the pace of research to replace this genotype which was gradually showing higher and higher degrees of rust infection was extremely slow and the planters had to resort to highly expensive spraying schedules with copper and other prophylactic and curative fungicides to save their crops and the coffee plants.

This was gradually followed by the introduction of Sln. 5, Sln. 6, Sln. 8 and Sln. 9 during the 1960's after a gap of 20 years. Individually these selections were excellent yielders with a high degree of rust resistance and were given for zonal trials to assess their performances under different climatic conditions, soils and elevations. Unfortunately and unlike the S. 795 and its improved varieties, these selections were not cultivated by the planters on a large scale due to lack of sufficient information of the results of the zonal trials. There were conflicting reports of their performances in different coffee zones which confused the growers.

FUTURE CULTIVATION

Further evaluation and improvement of these genotypes and detailed information of their performances under different climatic conditions will help the growers to select the best of these for future commercial cultivation.

The comparatively recent release Cauvery/Catimor genotypes was a great success in the initial stages as they exhibited many of the desired qualities expected from a highly evolved coffee bush. The yields ranged from 900 Kgs to 700 Kg/hec and they were resistant to most of the known rust races found in India. However, they were susceptible to the dreaded coffee stem borer.

Although high production levels have been attained with these genotypes, breakdown in rust resistance has been observed for the past few years, though substandard cultivation practices could be one of the reasons. The appearances of new rust races or mutants cannot also be ruled out. Now we learn that the CCRI has taken up the improvement of the genotype for rust resistance utilising the single crosses of H.D.T. and other Arabicas. It was discouraging to note that in Kenya Catimore variety is not recommended because of the quality aspect though they found it highly productive and resistant to leaf rust under their climatic conditions.

In recent years incorporation of quality trials of Cauvery Catimore variety by crossing with Ethiopian Arabicas known for their quality is also being pursued by CCRI group of scientists.

We as growers are anxiously awaiting the results of these plant breeding programmes with interest and concern. With interest due to their potential and with concern due to the past experience of delay in releasing new genotypes for commercial cultivation.

In addition to leaf rust the commercially cultivated coffees of Arabica and Robusta are susceptible to other fungal and insect pests. Some of the important ones are listed below :

1. Black Rot caused by — *Koleroga noxia*
2. Anthracnose caused by — *Colletotrichum Gleosporioides*
3. Brown eye spot caused by — *Cercospora coffeicola*

Some of the important pests attacking coffee are :-

1. White stem borer (*Xylotrechus quadripes*)
2. Berry Borer (*Hypothenemus Hampei*)
3. Red Borer (*Zeuzera Coffeae*)
4. Mealy bugs (*Planococcus Lilacinus*)
5. Shot-hole borer (*Xylosandrus compactus*).

Most of the pest and fungal diseases can be kept under control by adopting the well tested control measures recommended by the CCRI scientists, but I would discuss in this paper two most serious pests of coffee., the White stem borer and the recent Berry Borer, as they are causing serious damage to the Arabica and Robusta crops and becoming more expensive and frustrating to control.

The White Stem Borer (*Xylotrechus quadripes*)

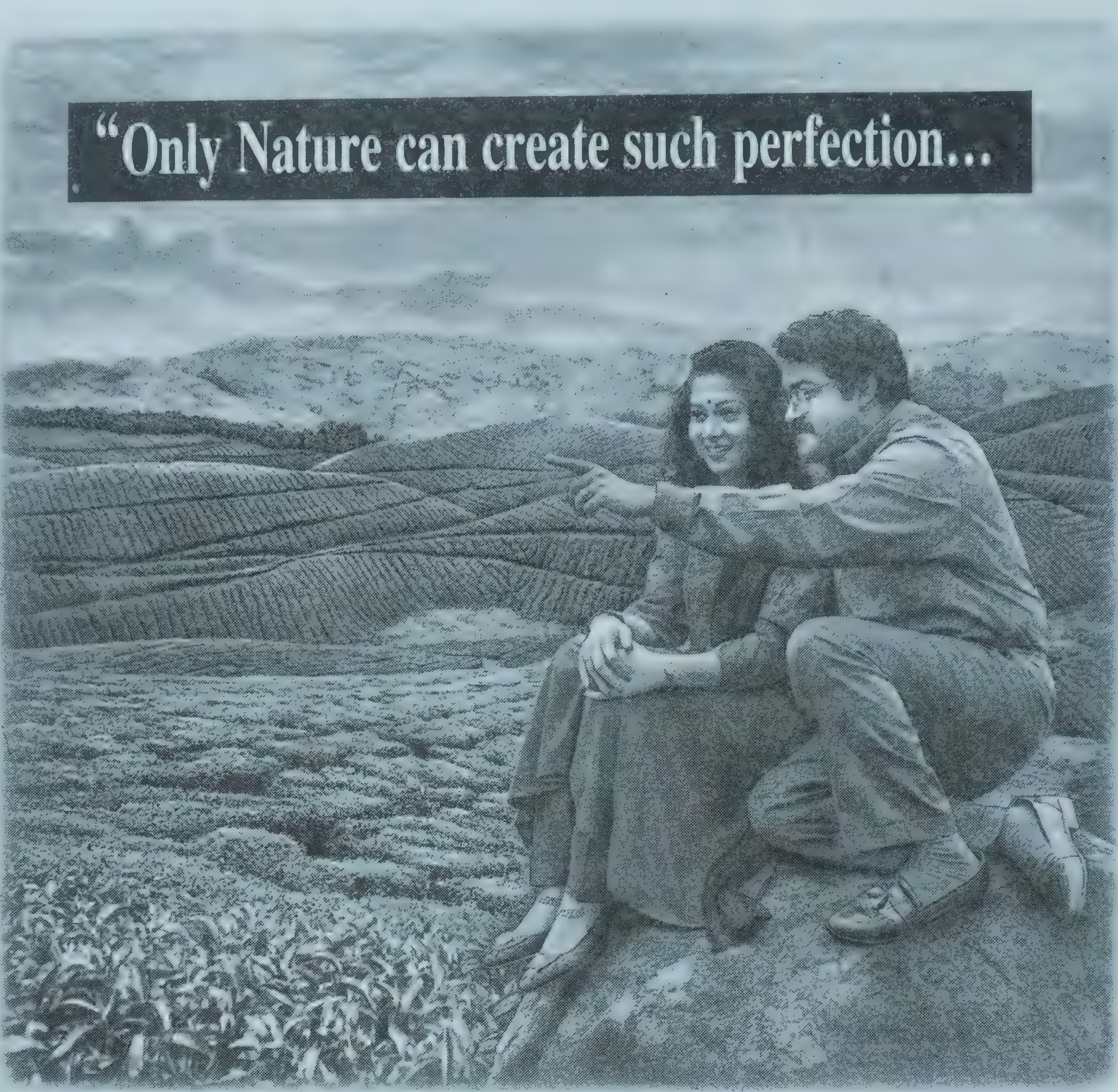
This is the most serious pest of Arabica Coffee and the problem is very severe in many plantations in spite of the strict control measures adopted by the growers. This problem is more serious because of our own negligence and careless attitudes among us. With the introduction of the early cropping Cauvery/Catimores this is being used extensively to interplant between young robusta plantations as a "Catch Crop", and temporary ground cover. These interplanted cauvery do not receive the attention of a pure Arabica plantation resulting in the plants being continuously infected by the white stem borer. Being a "catch crop" they are left to die a natural death in the fields when the Robusta covers up. The migration of this pest from these highly infected plants is posing a serious problem to the adjoining pure Arabica plantations.

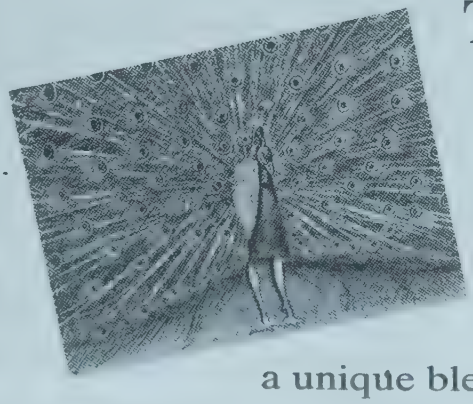
Experiments carried out by CCRI on bark scrapping of main stems and thick primaries of arabica coffee during July and August when the bark was soft, and swabing the stems with BHC suspension has given excellent results and is a distinct improvement over the conventional method of application of the pesticide. The older genotypes planted with a population density of 1600 to 2500 per hectare is now almost double with the introduction of cauvery dwarfs. The nature of their compact growth will make bark scrapping more difficult and labour intensive. Spraying with BHC formulations using Back-pack sprayers appears easier and efficient. Further studies of these problems in the field should be pursued to achieve more efficient control of this serious pest on Arabica coffee. Breeding stem borer resistant varieties has so far not been very successful.

Coffee Berry Borer (*Hypothenemus Hampei*)

Having briefly mentioned the problems faced by the growers to control the coffee leaf rust and the pest stem borer, we are now confronted with another serious pest; the coffee Berry Borer. Since its first appearance in the Gudalur Zone of Tamilnadu in 1990 it has been spreading at an alarming rate to the other coffee growing areas of South India. The experience of other countries where this pest is prevalent has been that despite effective quarantine measures, it spreads even under slightly favourable conditions. This happens to be true from our experience also and the growers should take serious note of the dangerous possibility.

When this pest was first noticed in the year 1990 in India, Coffee

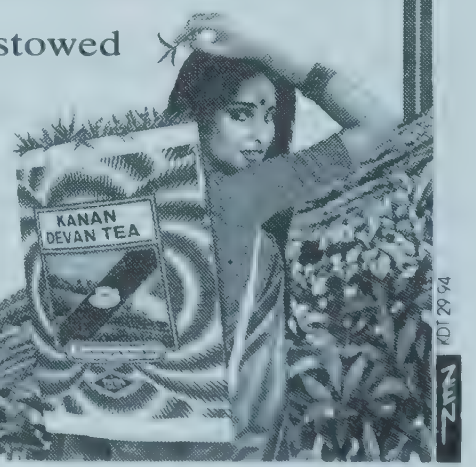

"Only Nature can create such perfection...



That's why no other tea can be Kanan Devan."

Of all Nature's creations, some stand apart as unique.
Exclusive. Kanan Devan Tea is one such creation
On Kanan Devan hills, Nature has bestowed
all its elements to create a tea that's
a unique blend of strength and flavour.

KANAN DEVAN TEA
Blended by Nature. Packed by Tatas.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Board swung into action and launched a vigorous campaign to create awareness among growers about the pest and guided them on the various control measures to be adopted.

Due to this and the awareness created by the Growers' Associations, the majority of the growers have a thorough knowledge of this pest and its control measures.

With the introduction of free sale quota in coffee marketing, chances of the Berry borer spreading to other uninfested areas is feared to be more. While there are well tested control measures recommended by CCRI scientists and others, the growers face certain problems in the field level which should receive serious attention. Of the many control measures, timely harvest is very important. As you all know, shortage of labour during the picking season is common to all growers and to harvest the crop poses a problem and will continue to be so in the near future. Harvesting robusta which is usually done when about 80 per cent to 85 per cent of the berries are ready makes it more vulnerable than Arabica which is picked in stages. Berry borer can survive for a period as long as 5 months. Breaking the continuity of the pest by thorough harvest is easier, but thorough gleaning in spite of spreading mats while picking will be only 50 per cent to 60 per cent efficient. Due to growers adopting sprinkler irrigation for Blossoms both for Robusta and to a lesser extent in Arabica, breaking the continuity of the pest becomes more complicated.

Because of irrigation, the coffee berries mature early and become highly vulnerable by about July/August and spraying Endosulfan during the rains will not be very effective. Once the borer penerates deeper into the berry, Endosulfan will have no effect on the borer. However, biological control by *Beveria bassiana* and by the import of parasitoids, the effectiveness of which is being evaluated in India and many other countries, is the hope of the future.

Superficial observations point to the preference of Berry Borer to Robusta berries than Arabica. I would like our scientist friends to enlighten us about this observation.

PEST ACT :

In excise of the powers conferred by section 4A of the Destructive Insect and Pest Act 1914, the Central Government invoked the Pest Act, vide Gazette notification dated November 18, 1992. The competent authorities to implement this Order are the plant protection advisor, Government of India, or the Chairman, Coffee Board or Directors of Agriculture and Horticulture of the State Governments. With powers vested with officers authorised by the competent authorities, a stricter monitoring and detection of the coffee pests in all the plantation areas should be taken up and stringent action taken whereever necessary in the general interest of the plantation industry.

It will be impossible to cover in this paper all the other parameters for the efficient production of coffee both Arabica and Robusta to sustain flucutating market conditions both in the international and domestic markets and unfourable weather conditions. The long pre-bearing periods and time lag between input application and response are also among the constraints for adopting the improved technologies in plantation crops.

FUTURE STRATEGIES

In coffee, future strategies should cover apart from varietal improvement, land and water management, multicrop systems, mechanization, labour productivity, fertiliser response with particular accent in slow release fertilisers, soil management, harvesting and processing technology, management and budgeting, organic coffee cultivation, ecological studies etc.

PRODUCTION STRAGEGY

Coffee is a very sensitive agricultural commodity and it should be our objective to see that fair returns are available to the producer. It also should be recognised that the International market trends influences the trade in the producing countries and no country can take steps in complete isolation and effectively safeguard the interest of the producers.

Indian Coffee has been passing through important changes in the recent past with the gradual liberalisation of coffee market since 1992-93. There is now an imperative need to insure the coffee grower and in particular the small grower against the fluctuations in coffee prices.

Due to the current high prices, large investments in coffee plantations all over the world will lead to a supply surplus and fall in prices as a consequence. We have to plan our production and marketing strategies so that the plantations, both small and large, remain viable when the world production and demand settles down to the Brazilian prefrost days. As growers, we must receive enough information to form a reasonable judgement of sales prospects and prices for our coffees. Much information however exists but locked away in the archives of multinational institutions and firms in the private sector. The library of the International Coffee Organisation contains a fund of data that is relatively freely available but is now dispersed. The new "coffee newsletter" published by the ICO contains a chronology of recent coffee events, concise data on production, consumption, stocks in trade and prices. This newsletter will improve market transparancy which is most useful to the growers.

Great changes are taking place in the coffee world of consuming and producing countries; competition from other beverages and the high prices for coffee has eroded the popularity of coffee to a great extent. If we quickly look into the latest available per capita consumption figures of larger consuming countries we find that during the 1st quarter of 1995, in Italy, Finland and the U.K. the consumption has increased or remained static, while in the United States, Sweden, Switzerland, Germany, Netherlands, France and Western Europe the per capita consumption has fallen by 2 to 3 per cent.

CONSUMPTION TREND

All over the world, coffee consumption trends indicate a change. Coffee is sold in combined flavours and espresso based concoctions. Officers also are changing over to Espresso machines to improve their brew. Marketing of high quality speciality coffees is expected to be more than 25 per cent of total coffee sales by the year 2010. The latest is ECOBREW organic coffee, which is gaining ground and the beans for this should come from plantations where no pesticide or fungicide is used.

Coming to our domestic market, India consumes about 75,000 to 80,000 tonnes of coffee annually and even here the high prices has created another problem of selling coffee mixed with chicory, a root crop. It is estimated that between 25,000 and 30,000 tonnes of chicory is consumed in India although by no standards can this beverage mix be called as coffee. The immediate need is to arrest the decline of domestic coffee consumption. A weak domestic market when compared to the unpredictable export markets is not in the long term interests of the grower or the consumer.

I have ventured to make a few remarks on the world coffee consumption trends as we have to depend mostly on the export market as the present domestic off-take of coffee is only about 40 per cent to 45 per cent of the total production.

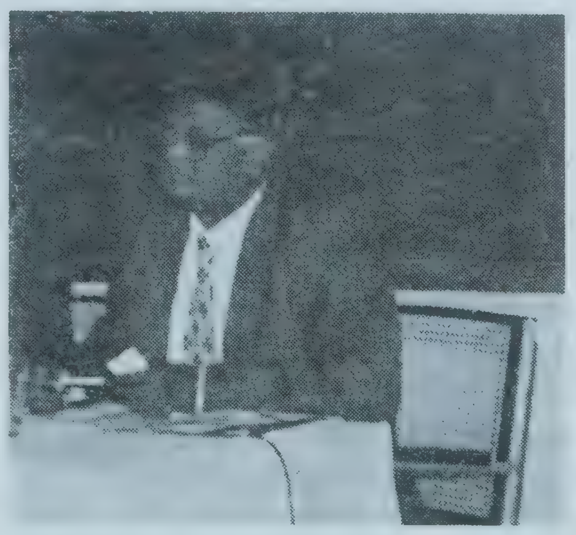
As growers, it is important for us to know these trends and must always keep in mind that we are not just selling coffee beans, we are selling an integrated part of a cup of coffee. If the end consumers do not like what they get, they will turn to other beverages. If, on the other hand, they like the coffee they are willing to pay for it and will continue to come back in preference to other beverages.

R & D STRATEGIES FOR INCREASING COFFEE PRODUCTIVITY

By

Dr. R. NAIDU*

Coffee is one of the leading commodities in the international trade. This stimulating beverage crop is currently grown in over 80 countries, contributing substantially to their national exchequers. In India, coffee has a place of pride among plantation crops and is mainly cultivated in the hilly tracts of Karnataka, Kerala and Tamilnadu and to small extent in non traditional areas such as Andhra Pradesh, Orissa, West Bengal, Maharashtra and North-eastern states. The total area under coffee cultivation in India is around 2,92,000 ha. with an annual average production of around 2 lakh MT. Coffee Industry has a gross turnover of around Rs. 2,000 crores and being an export oriented commodity, it contributes nearly Rs. 900 crores of foreign exchange to the national exchequer for the year 1994-95.



As an agro based rural enterprise primarily, this industry is a source of direct employment for about 4 lakh people in the area of cultivation apart from providing indirect employment to many in processing and trade sectors. Coffee cultivation is also instrumental in preserving the precious forest eco system in traditional areas while in non-traditional areas coffee was introduced to check the Podu cultivation/shift cultivation and thus to control denudation of forest and also soil erosion. Thus, the industry is second to none in its contribution to the areas of Rural Development, Environmental preservation, Employment generation, etc. in the Indian context.

INITIATION AND PRESENT STATUS

Organised coffee research started as one of the UPASI's initial activities and subsequently Mysore Coffee Experiment Station was established during 1925 at Balehonnur, Chikmagalur District, Karnataka. In 1946, this Research Station was annexed to the Coffee Board and expanded as Central Coffee Research Institute (CCRI) during 1962. This is one of the earliest Research Centres for coffee in the world serving the coffee growers of the country through developing improved planting material, evolving suitable package of practices, tackling the problems of pest and diseases and standardising the post harvest operations. In addition to the main station, a sub station at Chettalli, Kodagu, Karnataka and four Regional coffee research stations one each at Chundale (Kerala), Thandigudi (Tamil Nadu), R.V. Nagar (Andhra Pradesh) and Diphu (Assam) were established to pursue location specific research problems.

SIGNIFICANTACHIEVEMENTS

The notable accomplishments of the Research Department made so far are :

- ☆ Establishment of a massive gene bank of international recognition comprising of over 350 arabica collections, 15 robusta types and 17 different species of *Coffee*.
- ☆ Development of high yielding, rust tolerant, widely adaptable varieties (12 arabica and three robusta) which occupies over 85 per cent of the total planted area. These include the varieties suitable for high density planting, marginal areas and uniform ripening types.
- ☆ Generated number of single as well as double cross arabica hybrids and elite types of these are under field evaluation for their potential as future planting material.
- ☆ Standardisation of conventional vegetative propagation techniques and popularization of the same for practical application at estate level. This technology has helped in multiplication of elite robusta types and conversion of unproductive plantations to economically viable ones through wedge-cleft grafting (Top working).
- ☆ Standardisation of clonal as well *in vitro* propagation protocols for mass propagation which facilitate the production of true to types.

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* **Director of Research, Central Coffee Research Institute**

- Soil management practices such as digging in new clearing, scuffling in established plantations, staggered trenches/pits in gentle slopes, contour planting and terracing in steep slopes, drainage channels in flat areas were found to help not only in better conservation of soil and soil moisture but also in increasing the yield up to 21 per cent over zero tillage.
- Adoption of recommended spacing, topping heights followed by regular light pruning were found to help in better bush growth as well as consistant yields year after year.
- Irrigating drought susceptible robustas during dry months from Nov-Jan by sprinkler method was found to improve the yields by 85 - 95 per cent. Irrigation for blossom and backing alone would be sufficient to boost the yields by around 50 per cent.
- For Cauvery variety a spacing of 5' X 5'; topping height of 2.5' to 3.5' and a fertilizer dose of 160 : 120 : 160 Kg NPK/ha applied in 3-4 splits were found to be optimum.
- Chemical weeding with Gramoxone or Glycel was found to be effective than manual weeding. The cost of chemical weeding could be brought down by nearly one third by synergising with fertilizer salt urea @ 1 per cent in the spray solution.
- Irrigation schedules were worked out for robusta coffee and a simple technique using Cobalt chloride paper was evolved for identifying the time of irrigation.
- Standardised fertilizer schedules. Based on studies conducted on biomass and waste utilization, fertilizer dosage of 120 : 90 : 120 Kg of NPK/ha per year in three splits was found optimal and recommended.
- Identification of nutrient deficiencies and Corrective measures. This helped to ameliorate the more common Zinc disorder and thus resulting in substantial yield increases.
- Use of Citric acid found helpful in avoiding high 'P' fixation in soils and also useful for high micronutrient availability, especially Zinc.
- Developing drought alleviation methods. The germplasm and station bred selections were screened and found that Slns. 7.3, 9, 4 and 10 are more tolerant. As robusta is drought susceptible, a nutrient mixture in combination of NPK + Zinc was formulated for foliar application during dry period (Jan-March) which could increase the Crop yield by 22 per cent by alleviating drought effects. The cost benefit ratio of the applications were found to be 1 : 3 when drought period exceeds 110 days.
- Evolving effective methods for integrated management of pests. Efficient bio-control strategies have been worked out against mealy bugs using parastoids and the technology has been well demonstrated in planters fields. Use of fungal Pathogen *B. bassiana* against coffee berry borer has been found practically viable when integrated with other cultural and chemical control measures and procedures for mass culturing of the fungus were standardised.
- Graft combinations for the management of root lesion nematodes were tested and Arabica on Robusta root stock was found effective to overcome the nematode problem at estate level.
- Evolving effective disease control strategies through integrated management. Effective concentrations of systemic fungicides Bayleon 25 EC, Plantavax 20 EC, and Carbedazim and their spray schedules were recomended for the control of leaf rust, black rot, leaf spot diseases. As a bio-control strategy for the control of root diseases, use of *Trichoderma* sp. is being explored.
- Identification of physiological races in leaf rust pathogen for the first time in the world and developed *in vitro* and *in vivo* screening procedures for rust resistance. The potential of India as a major source of rust races was established by identifying as many as 23 different races out of 39 races reported from all over the world.
- Strengthened the international collaboration on breeding for rust resistance through participation in a EEC sponsored collaborative project with various coffee research institutes of the world.
- Standardisation of post harvest technology for quality improvement was achieved. In collaboration with TNAU, a scheme on improvement of coffee processing equipment is under progress. The objective is to improve for water energy use efficiency.
- Pollution abatement systems to protect natural water bodies and environment from the harmful effects of effluents released from on farm processing units have been formulated. A two stage biological treatment methods involving anaerobic and aerobic lagoon systems have been standardised.

A vast extension network has been actively involved in disseminating the developed technology among growers which greatly benefitted the largest chunk of small growers (98 per cent) in achieving economic returns. Besides the transfer of technology imparting training to the various levels of plantation staff is a routine activity of R & D Department for man-power development.

These concerted efforts by the research and extension group has resulted in increasing the production and productivity of coffee in India. The estimated 2 lakh tonnes of production at the turn of the century was achieved by 1988 itself and the revised target of 3 lakh tonnes is set for 2000 AD.

MARKET SCENARIO :

The Indian coffee industry has been undergoing marked changes since 1992-93 season liberalising the protected and monopolistic pooling coffee marketing system under Coffee Board. Internal sale quota (ISQ) of 30 per cent was introduced during 1992-93, permitting the grower to market the 30 per cent of his total produce on his own in the domestic sphere. As this change yielded beneficial results to the growers, the Coffee Act has been amended during 1993-94 and the market further opened by introducing the 50 per cent free sale quota (FSQ) facilitating the grower to sell 50 per cent of his produce in both the domestic as well as international markets. Subsequently, 100 per cent and 70 per cent FSQ was given to the small and large growers respectively in the 1994-95 season.

REORIENTATION :

Coffee trade has become lucrative in recent past because of the boom in international prices and growers are showing more devotion and interest in research and technological advancement in order to improve the production and productivity of their plantations. Moreover, quality of the produce is gaining importance to meet the demand of buyer's preference and international market. Hence, under the changed market scenario, R & D has a greater role to play for bringing much more prosperity to the coffee industry. Extensive re-orientation of the research programmes is warranted laying emphasis on advanced areas such as biotechnological approaches of crop improvement and post harvest technologies of processing and pesticide residue monitoring for quality improvement.

A section of the Audience

THRUST AREAS

Evolving low cost high production technologies by developing genetically superior planting materials, suitable package of practices, utilization of on-farm, non-cash inputs, environmentally safe and eco-friendly integrated pest and disease management schedules involving biological control methods, post harvest management for quality coffee production and pollution abatement systems are the thrust areas. The reduce the gap between actual and potential yield through efficient transfer of technology by using modern extension tools such as on farm evaluation, front line demonstration, mass communication media (Audio-Visual aids and Extension literature) and training to technical officers and growers are some of the activities to be strengthened.

FUTURE STRATEGIES :

Crop Improvement : Besides developing superior coffee strains through conventional breeding strategies with respect to leaf rust resistance and productivity, hybrid seed production technology (HPT), evolving of low caffeine coffees, genetic engineering and its application in transfer of useful and potential genes such as NIF and BT for crop improvement also contemplated. In addition, studying the developmental physiology of the coffee bush as a whole with special reference to shade, blossom formation, fruit-set and ripening, bio-tech approaches such as synthetic seed production, anther and cell culture, soma clonal variation, protoplast fusion, cryo-preservation to supplement main breeding programmes and micropropagation of elite types with technical support from commercial tissue culture firms have been identified to be the newer strategies in this important area of research.

Crop Management : Input optimisation, integrated nutrient management (INM), application of DRIS concept for nutrient budgeting, standardization of location specific technology, water conservation/ augmentation, efficient weed management, VAM and their exploitation, vermiculture, evolving high value organic coffee through organic farming, identification of techniques for better fertilizer efficiency (FUE), for large scale field applications are some of the priorities.

Crop Protection : Biology, Bionomics and ecology of major insect pests and isolation of pathogen, epidemiology including inoculum potential of diseases, Screening of chemical and eco-friendly biological and botanical pesticides for integrated pest and disease management have been identified. Further, integrated use of systemics and prophylactants in rust control for economy and increased efficiency is also contemplated. Synthesis of identified pheromone and its use as a component of IPM.

Post-Harvest Technology & Quality Improvement : Standardisation of farm-machinery, byproduct utilization, upgradation of quality of the produce through monitoring microbial contamination and pesticide residues, identification of chemical parameters and quality education, establishment of quality standards and monitoring through regional laboratories are some of the important areas of quality improvement. Evolving pollution abatement systems feasible for practical application at estate level is also one of the important aspect to be concentrated upon.

Transfer of Technology : Effective transfer of technology through extensive use of audio-visual aids, mass media and extension literature, on farm demonstrations in planter's fields, Identification and integration of Trend setters in evaluation of new technology, Trainings, campaigns on identified proven technologies are the priorities identified for extension workers. Imparting training to growers, professional managers, bankers, plantation staff on coffee culture has also been one of the means of transfer of technology.

Collaborative Research : Collaboration with National and International Institutes for fundamental and applied aspects of research, deputation of scientists for advanced and specialised training in the respective fields, approaching national and international funding agencies for sponsored schemes and identification of inter and multi-disciplinary programmes form a part of the collaborative research. Genetic transformation studies, DRIS norms for nutrient budgeting, post harvest technology and value added projects are some of the priority areas identified for collaboration with national institutes while breeding for rust resistance, biocontrol strategies against coffee berry borer and anti pollution measures are to be pursued with technical support from some of the international institutes.

Developmental Activities : Developmental activities were initiated during 1956 with the launching of comprehensive coffee development plan with the main objective of rendering financial assistance in the form of loans and subsidies for improving the coffee plantations. The development wing of Research Department prepares and implements technically feasible assistance schemes. Accordingly the Coffee Board has operated six types of loan schemes i.e. for intensive cultivation, extensive cultivation, replanting, special purposes, crop hypothecation and equipment/ machinery. Under these schemes a total amount of Rs. 83.31 crores was distributed to 60,702 growers with a benefited area touching 16,284 ha. till 1995. In addition five types of subsidy schemes such as subsidy on interest amount, replanting loan, expansion subsidy (dispensed from 1990), berry borer control scheme and water augmentation scheme. So far Rs. 14.80 crores was distributed under subsidy schemes.

Due to liberalisation of marketing system, the recovery of loans has become a major constraint. The Board is compelled to discontinue fresh loaning facilities. However, the Board is continuing subsidies to small and marginal plantations under differential rate of interest (DRI) scheme, replanting scheme and water augmentation scheme. Under water augmentation scheme a subsidy component of Rs. 325 lakhs is made available for the remaining 3 years of VIII Five Year Plan. This programme is available to small plantation (10 Ha) has considerable potential in boosting their productivity by improving the water resources for irrigation purposes. Apart from these the Board is also helping the growers in mobilization of resources through financial Institutions. This has paved the way for diverting the activities of extension staff from loan disbursal and recovery to the technical aspects.

Thus, Coffee Board Research Department has already geared up by reorienting the research, extension and developmental activities in order to meet the challenges of the changed coffee scenario. There is no doubt that these efforts will yield fruitful results with the constant support and encouragement of the enterprising planting community and thus benefit the industry by achieving increased coffee productivity.

INTEGRATED MANAGEMENT OF BERRY BORER

By

K. SREEDHARAN*

The Coffee berry borer *Hypothenemus Hampei* is a pest of major concern in 58 coffee growing countries including India. First noticed on a few plantations in Gudalur during the early 1990, the insect is now prevalent in an estimated area of 33,500 ha (13 per cent of the total coffee area) spread over Kodagu, Nilgiris and Wayanad Districts. Though there is a gradual spread in the affected zones, the pest has not so far been reported from other plantation districts.

BIONOMICS OF THE PEST

The adult female beetle enters into the beans through a circular pin hole made at the tip of the berry. Thouth berries in all stages of development are attacked, tunnelling and oviposition occur only in hard beans. The female lays 20-60 eggs in the tunnel. Under laboratory conditions, 12 eggs, on an average, were laid. Eggs hatched in about 10 days. Larval period lasted for 19 days and pupal period for 6 days. Development from egg to adult, under laboratory conditions, took about 35 days. The pest would survive, but not breed in well dried cherry, clean coffee and parchment. Studies using sticky traps indicated that the female beetles were dispersed on their own in a limited way. The process was slow atleast during the cropping season. The pest did not get attracted to lights of different colours (Arion, 1995). Chemical stimuli from ripe berries has been found to attract adult beetles to some extent (Giordanego *et al.*, 1993).

HOST PLANTS

The berry borer is strictly monophagous, requiring coffee berries for feeding and breeding. All the cultivated varieties of coffee are attacked without any consistent preference. The female beetles take temporary shelter in seeds of *Crotalaria, Lantana Maesopsis,* Duranta, Surinam cherry, Tamarind, Tea etc., without feeding and breeding (Vijayalakshmi *et al.*, 1994)

DAMAGE

Infestation on tender berries results in premature fruit drop or decaying of one or both the beans. In ripe berries the grubs make extensive feeding tunnels and damage crop. Severe infestation may cause up to 80 per cent crop loss.

INTEGRATED MANAGEMENT

A sound package of practices comprising of cultural, phytosanitary, mechanical, chemical and biological methods evolved through research in various countries, is now available for the integrated management of coffee berry borer.

Experience in India and elsewhere shows that the pest could be effectively contained by proper adoption of cultural and phtosanitary measures. As the pest breeds only in coffee, a considerably longer period without berries in the field will reduce the carry over inoculum. The favourable climate and abundance of ripe berries lead to a flare up of the pest during harvest period. Hence timely harvest is very important. It was observed that a 17 days delay in harvesting resulted in about 7 fold increase in infestation. The incidence in harvested crop was 13.8 per cent on timely harvest compared with 83 per cent in delayed harvest. (Anon., 1995) No berries should be left over, either on the plant or on the ground. Spreading gunny bags or polythene sheets on the ground while picking will help to minimise gleaning. Off season berries have to be stripped at the time of harvesting. If gleaning could not be collected, they may be swept along with the mulch and buried below 2.5 feet depth in the soil. In a study, the mean infestation level was as low as 1.5 per cent in estates which disposed gleaning compared with 13.6 per cent in those which did not remove gleaning (Anon 1995). In order to demonstrate the efficacy of

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*** Head, Division of Entomology/ Nematology, Central Coffee Research Institute.**

phytosanitary measures, the Coffee Board opened 37 experimental plots in growers' fields. The incidence was brought to negligible levels in all these plots.

Dipping infested berries in boiling water for 2-3 minutes kills all the stages inside. Drying coffee to the prescribed moisture level (arabica/robusta parchment 10 per cent i.e 15.5 Kg/forlit, arabica cherry 10.5 per cent i.e. 16 Kg/forlit and robusta cherry 11 percent i.e. 18 kg/forlit) prevents breeding in stored coffee.

Out of several insecticides tested world over, only endosulfan 35 EC has given sufficient protection. The insecticide at 340 ml/barrel along with 200 ml of wetting agent, sprayed when majority of the beetles are waiting in the pulp, is quite effective. The time of application could be about 120-150 days after flowering, but the decision should be based on the level of infestation on the estate. Spraying on ripe berries will be of no use. The Coffee Board is supplying endosulfan to growers at 50 per cent subsidy. Several botonical insecticides are being screened against the berry borer.

For biocontrol of berry borer, the entomopathogen *Beuveria bassiana* isolated from field population of the pest is under evaluation. In a laboratory biossay, 10^{-7} spores/ml with 0.1 per cent ground nut oil effected 100 per cent mortality of female beetles. Large scale field trials have been laid out with varying degrees of results. Application at 10^{-8} spores/ml with 0.25 per cent groundnut oil immediately after monsoon caused up to 46 per cent mortality. As the brood inside the berries is less affected by the pathogen, spraying has to be taken up before the beans harden. Technical assistance in culturing and application of the pathogen is extended to the growers at the field laboratory established at Siddapur, Kodagu.

Biocontrol using parasitoids is an integral part of berry borer management. Two parasitoids viz. *Cephalonomia stephanoderis* and *Prorops nasuta* have been introduced in many countries and the first one is found more effective against the pest. These two parasitoids have been recently imported into India from Mexico and are under quarantining at the Project. Directorate of Biological Control, Bangalore. After quarantining; the parasitoids will be released in the field during current season to evaluate the establishment.

As the pest is not capable of long distance migration on its own, transportation of infested coffee to uninfested areas is the main reason for its spread. Hence, the infested crop has to be dried on the spot, fumigated and then transported, using fumigated gunny bags.

The Coffee Board, in collaboration with various Governmental and Non Governmental agencies, is taking regular surveys and extension programmes to educate all those concerned with the coffee industry, particularly growers.

The Govt. of India have identified the coffee berry borer as a national problem. A National Mission on Control and Prevention of Coffee Berry Borer has been formulated to implement a time-bound action plan. The Board is in constant touch with organizations like ICAR, CSIR, DPPQS, Agricultural Univeristies, Non Governmental organizations and Growers Associations to make use of their expertise in the fight against the pest.

In the integrated management of coffee berry borer, growers' involvement is the crucial factor. As a community approach, the Coffee Board was able to motivate all the 83 farmers in a severely infested village in Kodagu to take up control measures. The combined effort of the growers helped to bring down the inoculum under economic injury level. This could form a model for the entire planting community so that the berry borer will never be a major threat to coffee industry. Our concrete efforts should be to contain the pest in the already infested areas and prevent its dissemination to other areas.

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— Paper presented at the Research Session on Coffee held in UPASI, Coonoor, on 11th September 1995.

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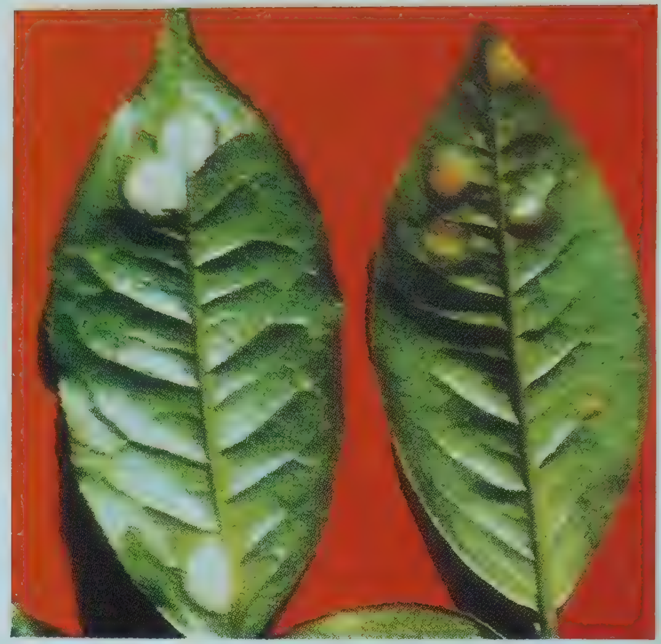

Unsprayed leaf **Calixin** sprayed leaf

Calixin sprayed tea leaf with blister showing typical green ring circling aborted lesion

% Mortality of mites with Calixin

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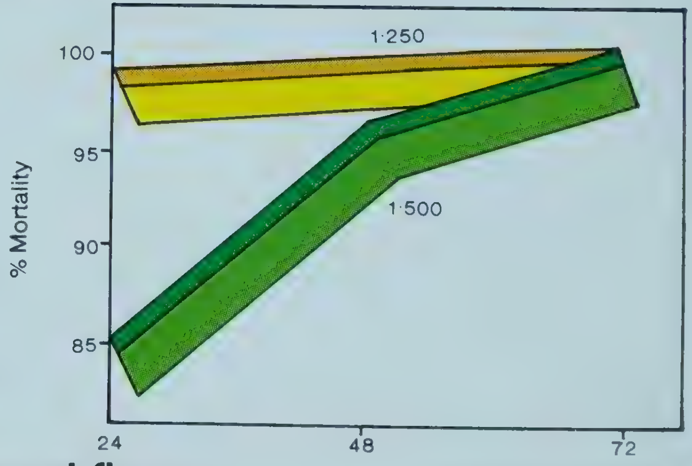
	1:250	**1:500**
24h	99.2	85.4
48h	100.0	96.5
72h	100.0	100.0



Hours after Treatment
(Source: "Pesticides" May 1980)

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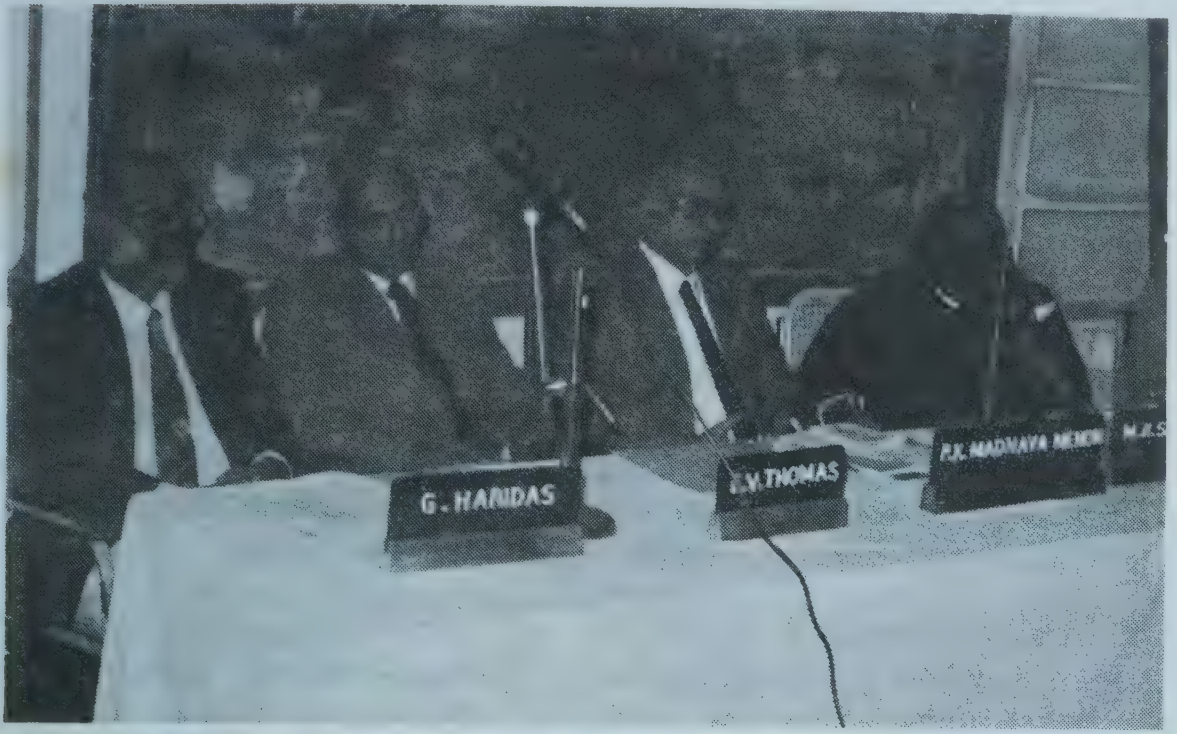
R & D PRIORITIES IN RUBBER

By
Dr. M.R. SETHURAJ [*]



Mr. P.K. Madhava Menon Chairman, UPASI Rubber Committee (third from left) making his welcome-cum-Opening Remarks at the Research Session on Rubber held on 11th September 1995. Others : Dr. G. Haridas, PALCOR Agri Consultancy, Dr. E.V. Thomas, Director (P & PD) Rubber Board and Mr. M.R. Sethuraj, Director, RRII.

Natural Rubber (*Hevea brasiliensis*) has registered significant growth in production and productivity and the country now occupies the fourth global position in terms of production. More significantly, the country has attained the first position in terms of productivity. The contribution of research & development in achieving this significant progress needs no emphasis.

MAJOR ACHIEVEMENTS

The contribution of research in productivity improvement and efficiency is reflected from the fact that India has now attained the first position in terms of yield per hectare (Productivity) in the World.

The Major contributions are summarised below :

- ☆ Evolved many high yielding clones of which clone, the RRII 105, has proved to be an outstanding clone widely accepted by the farming community. This clone is now being listed in the recommended clones by the Rubber Research Institute of Malaysia. The average productivity of this clone is 2 - 2.5 tonnes, which is realised by even small farmers.
- ☆ About 15 clones with an yield potential of more than that of RRII 105 are at various stages of evaluation. These will be released in a phased manner as soon as the large scale evaluation results are obtained.
- ☆ The RRII has also imported and selected many high yielding clones from other countries and the best among them will be released as and when large scale trials are over.
- ☆ Region-wise large scale clone trials are conducted and the selected clones are introduced to the farmers and on-farm trials to ensure farmer's acceptability.
- ☆ In order to develop location specific technology, the RRII has established four stations in North East, one station in West Bengal, one in Orissa, one in Madhya Pradesh and one station in Konkan region of Maharashtra. Two Hevea Breeding Stations have been established, one each in Karnataka and Tamil Nadu.
- ☆ Based on the large scale field trials conducted in these regional stations, a separate package of practices could be recommended for the North Eastern region.
- ☆ The RRII has registered significant success in production of tissue culture plants from high yielding clones through shoot tip culture. It has established about a hectare of plantation with these tissue cultured plants of which a part is an experiment comparing tissue cultured plants of three clones with their budded counterparts. This achievement is considered significant because even internationally reputed institutes like the Rubber Research Institute of Malaysia

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[*] **Director, Rubber Research Institute of India.**

could not perfect this tissue culture protocol.

- The Biotechnology Laboratory has also perfected a protocol for somatic embryogenesis and anther culture. A beginning has been made for transformation of the tissue with experimental genes to perfect the protocol for production of transgenic plants of agronomic value.
- The RRII has been given a pivatol role in coordinating an international research programme on Tapping Panel Dryness (TPD), a physiological disorder which remains unresolved in spite of eight decades of research. The Director of the RRII has been nominated as the International Coordinator for formulating and implementing this international network research programme. A significant breakthrough has been made by Random Amplified Polymorphic DNA technology in which it was shown that there is genomic difference between the susceptible and tolerant genotypes.
- The RRII has developed plant protection schedules for all diseases and pests.
- Based on extensive field trials the Institute has formulated recommendations for exploitation systems, clone-wise and region-wise.
- The Controlled Upward Tapping (CUT) system have been perfected and populatised.
- The Institute gives discriminatory fertiliser recommendation based on soil and leaf analysis. Efforts are underway to computerise this recommendation system. In order to sharpen the accuracy of this recommendation a new approach, Dignosis and Recommendation Integrated System (DRIS) is being extensively studied. By following the discriminatory fertiliser recommendation of the Institute, the planters in this country have avoided unnecessary use of fertilisers resulting in monitory benefit and reduced environmental pollution.
- Specific recommendations on weed management intercropping and other agronomic practices have been studied and issued for adoption by farmers.
- Use of biofertilisers to partially replace chemical fertilisers is being examined by conducting large scale experiments.
- The Institute has established agronomic feasibility of growing medicinal plants under the shade of mature rubber.
- The Economics Division has a comprehensive database on various uses of rubber timber, honey collected from the plantations as well as on rubber seed oil.
- The Economics Division is carrying out comprehensive study on the impact of different agro-management practices and levels of investment on the cost of production.
- The Economic Division has assisted the other biological divisions to study the economic optimisation of their recommendations.
- The Rubber Chemistry, Physics and Technology Division has perfected the production technology for Epoxidised Natural Rubber and a pilot plant has been set up. Negotiation with a commercial firm to up-scale this technology to commercial level is underway.
- The conditions under which sulphamic acid and sulphuric acid could be used as alternative coagulants for NR latex have been identified and appropriate recommendations issued.
- New preservative systems for latex have been developed for both short-term and long-term preservation.
- Solar dryers suitable for drying sheet rubber, which could significantly reduce firewood consumption, have been developed.
- Physical and chemical modifications of NR have been extensively studied and several modified forms evolved. These include oil extended NR, carbon black masterbatch, liquid natural rubber, polystyrene graft natural rubber, chlorinated rubber and epoxidised natural rubber. Transfer of technology for commercial production has already been done in the case of some of the items while attempts are being made for technology transfer in the other cases.
- Processes for the production of reclaimed rubber from waste latex products and from ground cuttings of microcellular solings (microcrumb) have been developed. Studies have also been undertaken for the optimum use of reclaimed rubber in various rubber formulation.

- Studies on blends of NR with synthetic rubbers such as emulsion butadiene rubber (EBR), solution butadiene (BR), styrene butadiene rubber (SBR) and EPM and EPDM rubbers and with thermoplastic materials such as polupropylene (PP), high density polyethylene (HDFE), 1, 2 polybutadiene and ethylene vinyl acetate (EVA) have been made in depth and scientific papers published.
- Properties of rubber vulcanisates such as transparency, set, abrasion resistance, chemical resistance, ozhone resistance etc, have also been studied in detail and improved rubber formulations identified.
- Formulations and processess have been developed for a number of rubber products for various applications by the defence and public sector organisations and the industry. Many of these items were developed as import substitutes.
- The RRII had participated in a UNIDO funded project on development of natural rubber based precured tyre retreading undertaken by the International Rubber Research and Development Board.
- NR based rubber compound was developed for the flex nozzle of the Geostationary Satellite Launch Vehicle and its technology transferred to ISRO.
- A comparative technological evaluation of different forms of processed NR which are used in the tyre industry, has been completed.

THRUST AREAS OF RESEARCH

India has been importing natural rubber to the extent of 10 - 15 per cent of its annual demand till last year in spite of the fact that rate of growth of production was maintained at a high level of about 11 per cent during the last decade. Though the country has now reached a temporary phase of transient self-sufficiency, the projections on consumption by 2000 AD and beyond indicate that India would remain a marginal net importer of natural rubber (NR) because with the projected increase in population and the expected growth in per capita consumption of NR, the possibility of becoming self-sufficient, is remote owing to the long gestation period of the crop, (production starts 6 - 7 years after planting) and limitations in the extension of area under cultivation of rubber because of socio-economic and agroclimatic constraints. However, this being a high value strategic and environment friendly crop, due priority is given to increase production and productivity and thus to reduce the gap between consumption and production to the extent possible. In this context, the contribution from research is considered critical.

THRUST AREAS

A. Agricultural aspects

(1) To give strong R & D support for extensions of area to non-traditional regions confronted with a variety of agro-climatic constraints such as prolonged drought, low temperature in winter, high temperature in summer and high altitude.

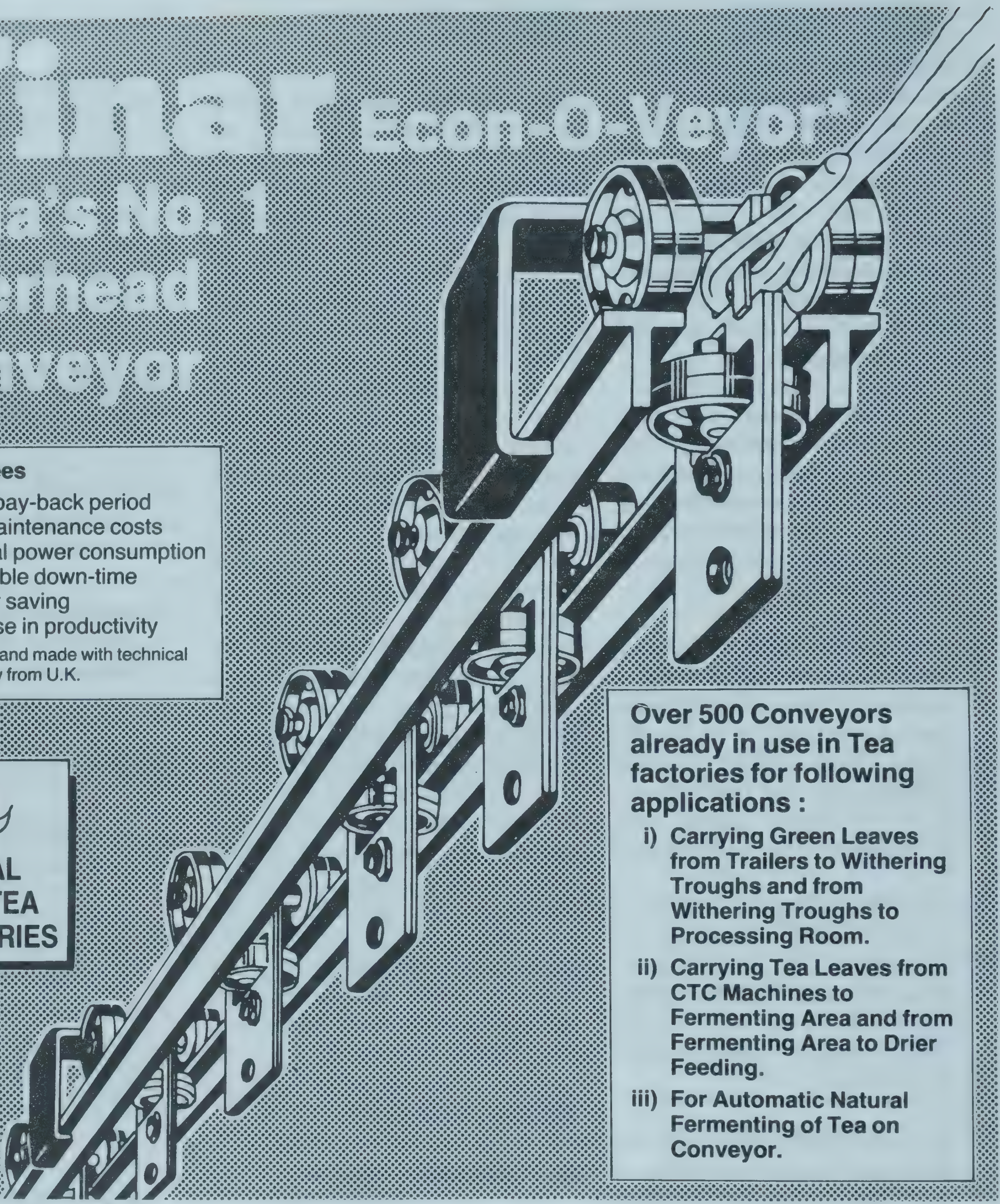
Major research priorities are :

- Selection and evolution of clones suitable for various agro-climatic regions.
- Integration of socio-economic and environmental factors to make rubber based agrosystems acceptable to these regions.
- To evolve appropriate nutrient and plant protection schedules for the non-traditional areas and
- To evolve suitable exploitation systems in tune with the climatic constraints of these regions.

(2) Improvement of the yield potential by evolving and introducing high yielding location specific clones.

The Major priority areas are :

- Breeding for high yield (clone showing a potential yield of 20 per cent or more than the highest yielding clone, RRII 105 — clone evolved by the RRII).
- Breeding and selection for specific agroclimatic regions (North East, Konkan region, Orissa etc.).
- Fundamental studies on yield components and the effect of various environmental constraints on yield and yield components.
- Screening of Brazilian germplasm traits related to productivity and disease tolerance.



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- Tissue culture and molecular approaches for productivity improvement.

(3) Rubber based farming systems appropriate to different agro-climatic regions and socio-economic situations.

Major thrust areas are :

- Agronomic and economic suitability of different intercrops, mixed farming system models, low input systems suitable for tribal areas.

(4) Integrated approaches to reduce the cost of production and improve quality competitiveness.

Priority areas are :

- Agronomic practices to reduce investment requirement during immature phase.
- Exploitation systems with reduced tapping frequency to save tapping cost.
- Judicious use of yield stimulant.
- Optimisation of plant protection protocols.
- Use of solar energy for reducing the processing cost.
- On-farm and shop-floor protocols to improve quality of processed rubber.

B. Research on processing systems and product technology

The Rubber Research Institute of India has a separate Rubber Chemistry, Physics and Technology (RCPT) Division for carrying out comprehensive research on all aspects of technology of processing, product quality and product development.

The thrust areas of this Division include :

- Identification of cheaper and effective coagulants for latex.
- Preservative systems for latex.
- Solar driers.
- Physical and chemical modification of NR for specific technological needs.
- Reclamation and recycling of rubber.
- Blends of natural rubber with different synthetic rubbers for specific service conditions.
- Basic studies on formulation for various and uses.
- Tyre retreading technology (UNIDO project).
- Development of new natural rubber based product.

IRRDB

The RRII is a member of the International Rubber Research and Development Board (IRRDB) and has participated in all international research programmes.

The Institute is recognised as a Centre for Ph.D work by the Calcutta University, Indian Institute of Technology, Kharagpur, Banaras Hindu University, Kerala Agricultural University, Cochin University of Science and Technology, Mahatma Gandhi University and Kerala University and the Institute admits Ph.D students and several scholors have already obtained Ph.D degree from here. It has collaborative research projects with Indian Institute of Science, Bangalore, University of Agricultural Science, Bangalore M.S. University, Baroda and with the Industry. As part of the IRRDB network research programme, the Institute has a collaborative research programme with the Advanced Centre for Virology, IARI, New Delhi.

INTERNATIONAL TRAINING

The Institute has imparted training to International Fellows from the Rubber Research Institute of Malaysia (Malaysia), IRCA (Rubber Research Institute, France), Rubber Research Centre Thailand (Thailand), Rubber Research Institute of Indonesia (Indonesia), Rubber Research Institute of Sri Lanka (Sri Lanka), South China Academy of Tropical Crops (China), Rubber Research Institute of Vietnam (Vietnam), Rubber Research Institute of Nigeria (Nigeria), The Polytechnic of Furtwangen (Germany) etc.

PUBLICATIONS

The Institute has so far published nearly one thousand scientific papers in leading national and international journals. The Institute has started publishing the Indian Journal of Natural Rubber Research from 1988, which has been well accepted and recognised internationally. The annual reports of the Institute have also been published since 1986-87. The books entitled 'Hardbook of Natural Rubber' Production in India and 'Rubber Wood - Production and Utilisation' are other major publications.

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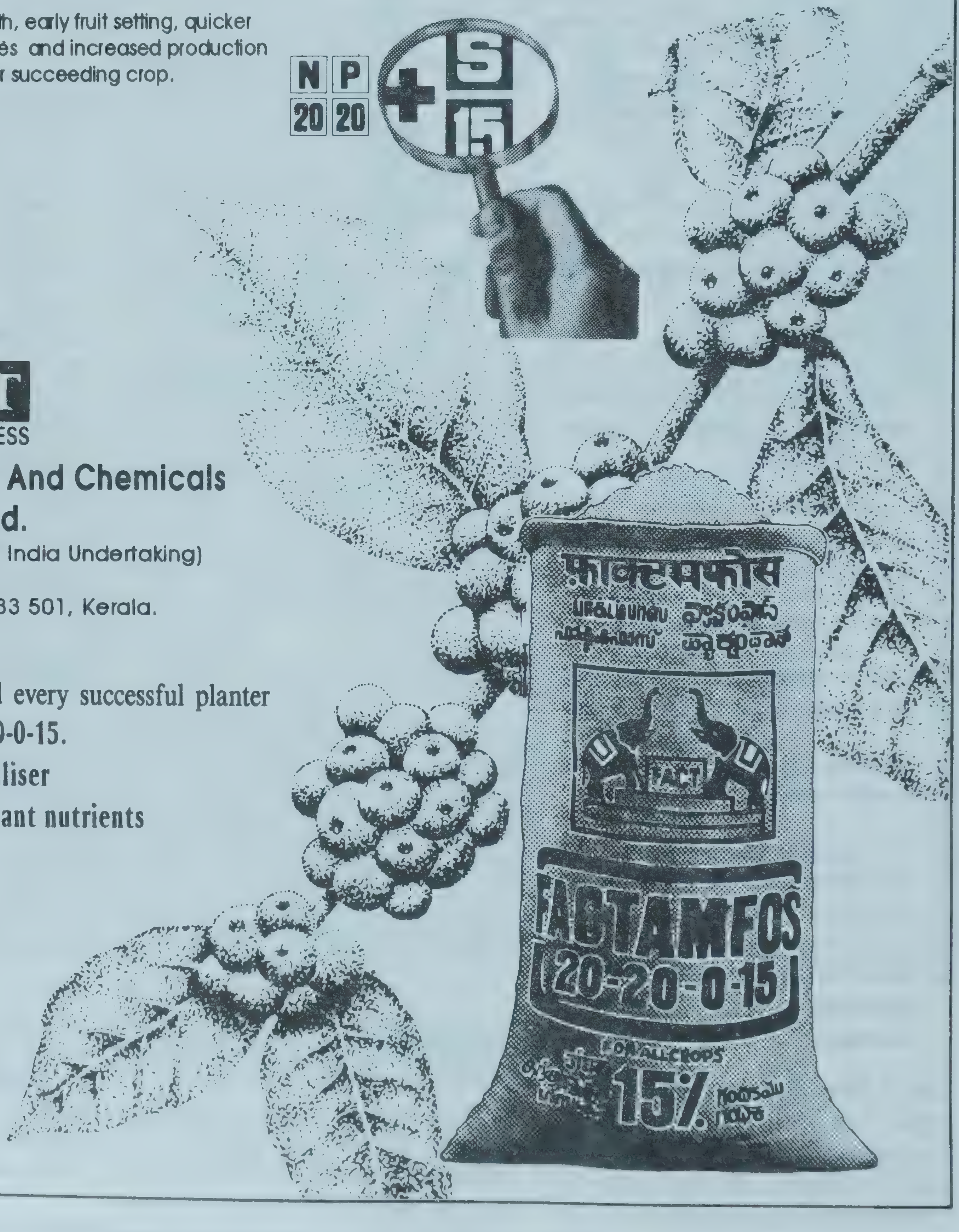

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RECENT TRENDS IN CARDAMOM RESEARCH

By
Dr. S.N. POTTY*

Cultivation of small cardamom (*Elattaria cardamom* Maton) is confined to the western ghats within an altitude range of 900-1500 m above MSL. Currently this crop is grown in an area about 83,000 ha distributed mainly in Kerala, Karnataka and Tamil Nadu and the production during 1994-95 was 7000 metric tonnes. India has been a major exporter of cardamom and the export figures in recent years are quite alarming as could be seen from the following data.

EXPORT OF CARDAMOM FROM INDIA

Year	Production (Tonnes)	Export (Tonnes)	Export as % of production
1974-75	2900	1626	56
1984-85	3900	2383	61
1994-95	7000	255	4

The competition from Guatemala in recent years is the major threat to Indian cardamom in ther international market. The entire production from Guatemala is being exported. Moreover the climate and soil conditions in that country are very favourable for high production. Therefore, Guatemala is offering their produce at much lower price than that of India. It is therefore, very clear that India can sustain in the international market only by offering cardamom of high quality at competitive prices.

The average productivity of cardamom is only 84 Kg/ha at present (Kerala, Karnataka and Tamil Nadu) which is far below the achieved potentials. To site an example the average productivity of Manjushree Plantations for the last three years have been 338 Kg (1992-93), 662 Kg (1993-94) and 533 Kg (1994-95) per ha and the maximum productivity achieved is 1523 Kg/ha in one of the fields. Such yield gap analysis shows that there is tremandous scope for improvement of productivity of cardamom in our country. Systematic research efforts are being made by the Indian Cardamom Research Institute under the Spices Board to bridge the gap between the average productivity and achieved maximum productivity and also the break the present yield barriers.

The major research focuss on cardamom are on :

1. Crop improvement
2. Agro techniques
3. Integrated pest management
4. Integrated disease management
5. Post harvest technology
6. Transfer of appropriate technology to growers.

It is imperative to state that all the above programmes are complementary to each other and only a total package integrating all the essential components would yield desired results.

CROP IMPROVEMENT

The crop improvement programme involved the collection of available germplasm within the available genetic diversity which was enriched in due course. The conventional crop improvement techniques are selection and hybridisation, though modern techniques involving biotechnology and genetic engineering are being employed in many crop improvement programmes.

Cardamom, being an open pollinated crop, exhibits high genetic variability and therefore offers immense scope for crop improvement through selection. The present achieved yield level of above 1500 Kg/ha is from clones developed through selection of elite plants from the

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* Indian Cardamom Research Institute

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existing genetic variability of cardamom. The research efforts made so far has resulted in the release of five varieties in cardamom viz., ICRI-1, ICRI-2, CCS-1, PV-1 and Mudigere P1. A few more varieties are in the final stages of release. Eventhough these selections have yield potential of above 1500 Kg/ha, the productivity is found to be in the range of 275-375 Kg/ha under medium level of management and rainfed conditions. Further attempts are in progress.

HYBRIDISATION :

The present yield barrier of the potential productivity of the available clones can be broken only through hybridization and application of modern techniques of genetic manipulations.

A modest beginning has been made in hybridization of cardamom which was resulted in the identification of five high yielding F1 hybrids having yield potential of 350 to 540 Kg/ha under rainfed conditions with medium level of management. The percentage of these clones are MCC 61 X MCC 35, MCC 61 X MCC 34, MCC 61 X MCC 16, MCC 34 X MCC 3, MCC 12 X MCC 35.

In the recent hybridization programmes of the institute, judicious selection of parents based on yield components is made in order to combine the desirable components and thereby upgrade the available selections. The major yield components identified are :

1. No. of tillers
2. No. of bearing tillers
3. No. of panicles
4. No. of racemes/panicle
5. No. of capsules/panicle
6. Capsule size

Other factors like capsule colour, volatile oil content, relative tolerance to pests and diseases, wider adaptability etc., are also considered for selection of parents. The 1995 breeding programme involves cultivars like MCC 49, MCC 61, MCC 260 (Green gold), MCC 345 (Puttady) etc., which have one or more of the desirable attributes.

SOMACLONAL VARIATIONS :

Exploitation of somaclonal variations is another potential tool for crop improvement. Eventhough, protocols for such studies have been perfected, this project is now given a low priority as we have not yet fully exploited the natural genetic variability.

The major thrust areas identified in this aspect are the optimum utilisation of resources such as land, plant nutrients and irrigation water. A judicious combination of crops in a mixed cropping or planting system would enable the growers to sustain their income, especially when the price level of various cash crops fluctuate over years. A potential area for research is to work out cropping models incorporating compatible crops like coffee, pepper, cardamom and vanilla.

Another area of research is on the nutritional management for cardamom. Eventhough fertiliser schedules for different situations have been recommended, the current approach is to refine the technology through the diagnosis of the nutritional requirement. Attempts are on way to perfect the tissue analysis which is the most efficient and economic method for fertilizer usage. Modern techniques like DRIS (Diagnosis Recommen-dations Integrated System) and Evaluation of nutrient models derived based on absorption isotherm are being attempted for tissue diagnosis and soil fertility evaluation. Deficiency due to micronutrients, especially Zn is often encountered. An ad-hoc research scheme funded by ICAR is in progress to identify areas deficient in micronutrients and for recommending corrective measures. The preliminary investigations revealed the scope for foliar application of major nutrients and therefore investigations have been taken up on supplementing soil application with foliar feeding.

There is no opinion that irrigation in cardamom gives immediate response. However irrigation water, being a scarce

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resource in the cardamom plantation, should be used in such a way that maximum benefit is derived from the available water source. Comparison of various systems such as drip, sprinkler and conventional watering coupled with frequency of irrigation is another thrust area.

Integrated nutrient management is gaining importance in the present day agriculture where in the use of chemical fertilisers are being reduced primarily with concern about the environment. Perfection of techniques for fast and efficient composting, vermicomposting using farm waste and use of bio fertilisers are some of the feasible approaches for achieving the goal of sustainable agriculture. Augmentation of earthworm population in situ in cardamom plantations through native and exotic earthworm species for enhancing efficient and fast decomposition of trash and weed materials is one of the surrent attempts.

INTEGRATED DISEASE MANAGEMENT

Damages due to various severe diseases invite our immediate attention. The major diseases due to fungal pathogens are the rots affecting capsules, rhizomes and nursery seedlings, leaf blotch and leaf blights. Besides these, a few viral diseases such as 'Katte', Nilgiri Necrosis' and 'Kokke Kandu' also cause severe crop losses. In addition to this a number of minor diseases appear sporadically and affect the plant health and crop quality.

Research has enabled in identifying the causes of major diseases and developing the control measures. Integrated Disease Management Strategy using plant sanitation and fungicides have been developed to manage all the fungal diseases affecting cardamom.

The recent trend in disease management strategy is the introduction of ecofriendly systems involving the use of bio-control agents and beneficial micro organisms. As chemical pesticides are becoming highly expensive and environmentally unsafe these are now being replaced with less expensive ecofriendly beneficial organisms such as antagonistic fungi and bacteiria which are capable of fighting against pathogens and controlling diseases. Several such fungi and bacteria are known and are being widely used as biopesticides.

Trichoderma sp. is an efficient antagonistic fungus which is found to be highly effective in controlling the soil borne diseases of cardamom. Nursery and field experiments have shown that *Trichoderma viride* and *T harazianum* are highly potential bio-control agents against azhukal and rhizome rot diseases of cardamom. Techniques are being developed for the large scale use of *Trichoderma* in biocontrol programmes right from seed sowing to harvesting stage of the crop.

Other areas of introduction of new technology is in the field of indexing of viral diseases and their management. Viral diseases are systemic and incurable. The only method of management is through roguing of diseased plants. The usual method of detection of diseased plants in the field is only through visual symptoms which often masked in initial stages. For the quick diagnosis during the symptom period, techniques such as ELISA or Western Blotting can be used. In pilot trials, it has been found possible to develop ELISA technique in early diagnosis of Katte and Nilgiri Necrosis viruses. Intensive efforts are being made to develop ELISA detection kits for the early diagnosis of viral diseases through collaborative projects with well established virology laboratories. Such diagnotic techniques, once developed, can be advantageously used for screening so that further spread through planting materials can be prevented.

INTEGRATED PEST MANAGEMENT

Thrips, root grube and shoot borers are the major pests of cardamom crop, though sporadia incidence of white fly, hairy caterpillar and nematoda cause economic losses to the

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crop. An Integrated Pest Management Package has already been developed for addressing the pest problems wherein the pesticide load has been considerably reduced by appropriate combination of cultural, mechanical and chemical measures. Nevertheless there is an imperative need for further reduction in the use of pesticides, both from the point of human health and environmental safety. The importing countries are becoming more and more strict on the residue level in the produce as could be seen from the following :

Tolerance Limit of Pesticide Residue
(Germany)

Pesticide	Residue level (ppm)
Endosulfan	0.10
Chlorpyriphos	0.05
Phosalene	0.05
Quinalphos	0.01

The recent approach in pest control in cardamom is the use of botanical pesticides and bio-control agents to the maximum extent possible and keep down the population of pests below the economic threshhold levels. Neem oil and Neem oil Cake are already in the list of proven plant products for containing white fly and root knot nematodes respectively. Among the emerging botanical pesticides, growth inhibiting effects of *Lantana Camera* extract on hairy caterpillar and shoot borer is worth further intensive research for field level application.

Another emerging field is the bio-control of pests through micropathogens like fungi, bacteria and entomopathogenic nematodes. Control of cardamom shoot borer by the injection of the bacteria *Bacillus thurungiensis* into the bore hold prevents further field infestation. Entomopathogenic nematodes viz; *Heterorhabdities* sp. and *Stenernema* sp. have been found to give effective control of root grubs under laboratory conditions and this technology is in an advanced stage of field evaluation. Eventhough, *Beauveria bassiana* infests the adult root grub beetles and *Ascherosonia placenta* infests on the nymphs of whitefly the exploitation of these bio-pesticides needs further efforts for mass multiplication and suitable commercial formulations. The biopesticides and botanical pesticides are toing to be the promising candidates for pest management in the twenty first century specially in the context of pressing demand for eco-friendly and organically produced products.

Honey Bees: The drastic reduction in population of the native honey bees *Apis cerena indica* due to TSBV disease has caused considrable concern during the last few years. Studies on the feasibility of *Apis mellifera* as alternative pollinator bee is one of the recent attempts besides searching for TSBV tolerant strains of *Acerana indica.*

POST HARVEST TECHNOLOGY

The research programmes on this aspect are aimed at improving curing, packing and storage of cardamom to retain green colour and flavour till the produce reaches the consumer. The studies include pre-curing treatment of capsules with certain identified chemicals, optimum time of harvesting for maximum recovery of oil and modified packaging and storing for shipment. There is considerable scope for improvement of the conventionally used curing houses to make them fuel efficient with minimum drying time and at the same time ensuring quality of cardamom.

TRANSFER OF TECHNOLOGY

Apart from the conventional methods for transfer of technology, the Institute with the financial assistance of Department of Biotechnology, Govt. of India, launched a massive demonstration-cum-trial to evaluate and demonstrate the performance of plants derived through tissue culture vis-a-vis open pollinated seedling plants. The results from 133 grower fields show that the tissue culture plants yielded 35-40 per cent more than the open pollinated plants. ✪

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SRI D.K. MUKERJI, CHAIRMAN AT THE 72ND ANNUAL GENERAL MEETING HELD ON 16.09.1995 AT THE REGISTERED OFFICE OF THE COMPANY

Gentlemen,

It gives me great pleasure to welcome you to the 72nd Annual General Meeting of the Company.

The Directors' Report and Statement of Accounts have been in your hands for sometime, and with your permission, I shall take them as read.

The profit for the year was Rs. 18,84,959/- after providing Rs. 14,00,000/- for taxation and Rs. 16,26,566/ for depreciation. These modest results were achieved with the assistance of our minor crop coffee which was sold at very remunerative prices because of the sharp rise in coffee prices since June 1994.

The crop harvested was 13,21,441 kg of tea, lower than the 1993-94 crop and well below the 1990-91 record crop of 15,42,475 kg. The reduced crop coupled with the decline in the unit value of tea, for the year under review, had an adverse impact on the bottom line. The general decline in the unit value was reflected in a Rs. 9.91 per kg decline during 1994 in the Auction selling averages at all South Indian auction centres compared with 1993. In our last year's Directors' Report, we indicated that the financial year under review was likely to be a difficult one, and this proved to be the case. There were periods in mid-1994 when poor teas were unsaleable.

For the 12 months of our financial year our average sale prices declined by Rs. 4.57 only because 'CHINNAR' teas are well established as amongst the best mark in South India. At Haileyburia we had problems in maintaining manufacturing standards, and for a period during 1994 that Estate's teas were difficult to sell even at substantial discounts. The problems at Haileyburia were overcome and quality standards are fully restored which is reflected in current selling prices.

Prospects for the current financial year are encouraging. We have budgeted for a large crop in excess of 15,00,000 kg and the crop to-date is well ahead of last year. Tea prices generally show a sharp rise compared with last year, and more important, prices for good teas are quite buoyant. Also, there are indications that a shortage position may manifest itself towards the end of the year, and this would be to the benefit of higher prices.

Your Company has to meet the challenges of the future by aiming for rising crops, a continued emphasis on quality in field and factory, and better productivity throughout the organisation. In marketing, we need to develop more value added channels of disposal, in addition to our on-going packet tea sales in Kerala.

The Tea Industry's export performance last year was very disappointing at 149 m.kg. This year exports show a rising trend but a concerted effort is required to regain erstwhile markets and improve export performance. The FAO projection for the year 2005 has India's tea production at 1019 m.kg of which 250 m.kg will be exported, and these estimates are only achievable with great effort and endeavour.

Our minor crop coffee deserves special comment as the very good prices realised for our coffee crop helped to register an overall profit for the year. During the current financial year coffee prices remain very remunerative, although declining from the peak levels in early 1995. Coffee marketing has undergone a sea-change in recent times and this year 100% FSQ has been permitted for all small growers and 70% FSQ for the larger planters. The private sector Coffee Auctions held in Bangalore under the aegis of the Indian Coffee Trade Association are now held every week and well established. There are several other marketing avenues open to the coffee planter. The coffee industry is therefore on the threshold of complete free trade. Coffee prices in India are now dependant on International price levels determined every day in London and New York, hence prices fluctuate considerably even in the short term. Coffee consumption in India has declined by more than 25% during the last 12 months, as the direct result of high prices.

Your Board's policy remains to maintain the properties in the best possible condition and continuously improve the infrastructure facilities of the Company. Planting companies continue to bear a quite unjust burden of taxation. We hope some tax relief will be forthcoming in the foreseeable future to enable us and other companies to plough back larger sums and thereby accelerate growth.

We are cautiously optimistic that the current financial year will witness much improvement in results, and this will partly depend upon the crop increase being further improved during the balance 6 months of our Company year.

On behalf of the Board I thank the officers and employees at all levels for their loyal and diligent services.

— Advt.

PEOPLE, PRODUCTIVITY AND PROFITS IN PLANTATIONS

The Indian Institute of Plantation Management is organising its Second Short-term Executive Programme on the above mentioned theme between 11th and 15th December 1995 in Bangalore for the benefit of Managers and owner-Managers in Plantations and other agri-business enterprises. The participant fee is Rs. 6,000/-.

Those who are interested in the Programme may obtain complete details by writing to :

Prof. M. PANDURANGA VITHAL,
Programme Guide,
INDIAN INSTITUTE OF PLANTATION MANAGEMENT,
No. 8, Cunningham Road,
KSCMF Building, Block III, 4th Floor,
BANGALORE - 560 052.
Fax : 080 - 2204537
Tel : 080 - 2203427

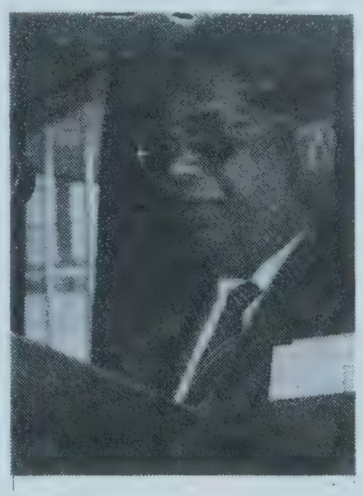
DEVELOPMENT AND TRANSFER OF TECHNOLOGY

The Thirty-second UPASI Scientific Conference was held at Coonoor on September 11, 1995. The theme of the conference was "Progress in Development and Transfer of Technology for Tea Production".

Mr. A. Ramesh Rao, President UPASI, inaugurated the conference.

Mr. M.H. Ashraff, Chairman, UPASI, Tea Committee, in his opening remarks, complimented the UPASI Scientific Department for its yeomen service to the tea industry. ". . . . with the tireless research and extension efforts put in by our scientists and advisory officers in the UPASI Scientific Department, the South Indian tea industry has made good progress and achieved significant strides".

Mr. Ashraff then briefly outlined the salient features of research work under way at the TRI. He extended a warm welcome to the delegates and invited them to take active part to the discussions.



Dr. A. Abdul Kareem, Director, UPASI Tea Research Institute, extended his own welcome to the delegates and thanked the Chairman for his glowing tributes to Scientific Department. He assured the members that the Department would not rest on its laurels and that his team of scientists and extension personnel would strive for excellence. The scientists have come up with successful recommendations in the past for improving the tea crop by way of providing field-tested clones of high productivity, for achieving a higher production and maximising the crop production process. The entomologists and pathologists have been contributing continuously towards the newer methods required for protection of tea plants from pests and diseases. Only an integrated role played by researchers from crop improvement, crop production and crop protection divisions will bring in rich dividends in all respects. Dr. Kareem, then went on to introduce the speakers.

Dr. T.C. Chaudhuri, Director (Research), Tea Board, spoke at length on "Tea Research in India — Future Priorities". He said that actual growth in production rate during the last 20 years was 2.5 per cent while domestic demand increased to 4.2 per cent. Based on this trend, tea production in the year 2000 would be 910 m.kg and domestic demand 756 m.kg. Dr. Chaudhuri went on to discuss ways and means of

A section of the audience.

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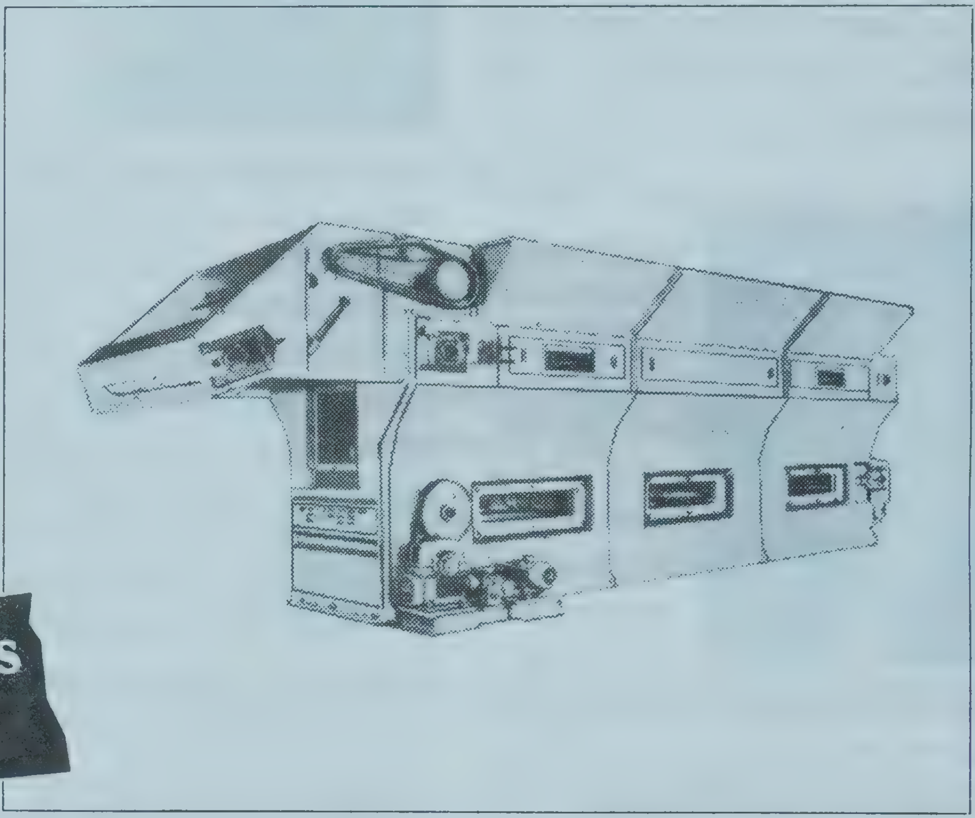

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achieving the production target of 1000 m.kg by the turn of the century.

Dr. Chaudhuri discussed at length on the levels of pesticide residues in tea and the efforts being taken by the different tea research institutes to see that the teas exported from the country fell well below the Maximum Residue Limits proposed by EC.

Dr. A.K. Gupta, Director, CSIR Complex, Palampur, spoke on the tea situation in Himachal Pradesh. Tea agrotechnology developed elsewhere as well as locally were adopted in the State. This had helped to increase tea production from 6.7 lakh kg in 1985 to 13.0 lakh kg during the last two years. The industry is now looking forward to 20.0 lakh kg by the end of the century. There is also scope for improving quality through the use of good planting material and proper manufacturing process.

Dr. N. Satyanarayana, Head, Division of Botany, UPASI Tea Research Institute, highlighted on the identification of 13 promising accessions and five biclonal seed stocks with combination of traits for higher yield, superior quality and drought tolerance. Seven grafted clones were known to combine the high yielding quality from scions and drought tolerant qualities from root-stocks. When these findings reach the releasing stage, definitely they will help us overcome drought and achieve higher productivity, combined with quality.

Dr. D.P. Verma, Head, Soil Chemistry Division, informed that soil application of phosphorus in alternate years based on soil test value and yield level could be supplemented with annual foliar application of phosphorus (10 kg P_2O_5/ha) for sustained productivity of tea in south India.

Dr. B. Chandra Mouli, Head, Plant Pathology Division, evaluated hexaconazole, a systemic triazole fungicide and observed that it offered significant and marked blister blight control at 200 ml/ha in combination with 210 g of copper oxychloride. A schedule of sprays with hexaconaole and copper oxychloride with limited number of sprays was a better alternative to the presently used copper oxychloride and nickel chloride combination.

In the last paper Mr. J.B. Hudson, Senior Advisory Officer, Advisory Centre, Munnar, spoke on transfer of technology in tea, the achievements and challenges. To achieve the target of 1000 m.kg by 2000 AD certain thrust areas for further development which when tackled, would accelerate the tea production rate.

There were lively discussions after each paper. Dr. A. Abdul Kareem, summed up the proceedings of the session.

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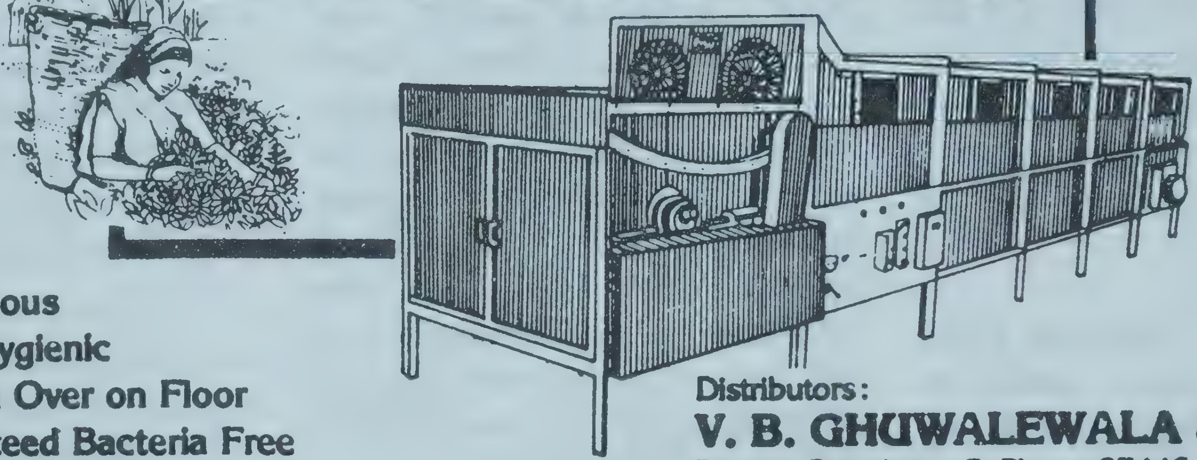

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UPASI SPORTS COMPETITIONS - 1995

RESULTS

1. Men's Tennis Singles (Apparanda cup)
Winner : M.C. Thimmiah
Runner-up : V. Sivaramakrishnan

2 Men's Tennis Doubles (OPEN) (Solar Syndicate Cup)
Winners : V. Sivaramakrishnan &
Sarvesh Naidu
Runner-up : V. Ramaswamy &
Raghav Sarma

Men's Tennis Doubles (Open)
Winners : V. Sivaramakrishnan & Sarvesh Naidu
Runners-up : V. Ramaswamy & Raghav Sarma

3. Men's Tennis Doubles (Drawn) (P.L. Centenary Cup)
Winners : M.C.Thimmiah &
J. Jayachandra
Runners-up Satish Abraham &
K.S. Kuttiah

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Cast

Men's Table Tennis Singles
Winner : V.Sivaramakrishnan

4. Men's Inter-Dist. Tennis (Inter-Dist. Tennis Trophy)
Winners : Sarvesh Naidu &
V. Sivaramakrishnan
(High Range)
Runners-up : V. Ramaswamy &
Raghav Sarma (Nilgiris)

5. Veteran's Tennis (Singles) (C. Ramachandra Rao Cup)
Winner : V. Ramaswamy
Runner-up : Satish Abraham

Men's Golf (Open)
Winner : Dilip Thomas

6. Veteran's Tennis (Doubles) (Veera Trophy)
Winners : V.Ramaswamy &
Satish Abraham
Runners-up : J. Jayachandra &
Jose Kallivayalil

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Contract Bridge
Winners : N. Ramadurai & R.S. Gokhale

7. Ladies' Tennis Singles (Miss Barber Challenge Cup)
Winner : Mrs. Savitha Chengappa
Runner-up : Mrs. Vimala Abraham

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Sports Person of the Year
Mrs. Indira Prakash Shetty

8. Ladies' Tennis Doubles (Drawn) (Singara Challenge Shield)
Winners : Mrs. Indira Prakash
Shetty &
Mrs. Cherie Grewal
Runners-up : Mrs.Savitha Chengappa
& Mrs. Shajia Sivarama
Krishnan

9. Mixed Doubles Tennis (Drawn) (Stanes Challenge Cup)
Winners : Mrs. Vimla Abraham &
M.C. Thimmiah
Runners-up : Mrs. Savitha Chengappa
& P. Amarnath

10. Men's Table Tennis Singles (Ben Grom Cup)
Winner : V. Sivaramakrishnan
Runner-up : Dr. V.K. Sivakumar

11. Men's Table Tennis Doubles (Drawn) (Rallis Championship Rolling Trophy)
Winners : Dr. V.K. Sivakumar &
K.S. Kuttiah
Runners-up : V. Sivaramakrishnan &
K. Parathasarathy

UPASI Cricket Team — Winners : UPASI-DSSC Meet

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UPASI SPORTS COMPETITIONS - 1995

Best District — Winner : Nilgiris
K. Ashok receiving the Jaisri Trophy

12. Ladies' Table Tennis Singles
    Winner : Mrs. Indira Prakash Shetty
    Runner-up : Mrs. Vimla Abraham
13. Ladies' Table Tennis (Drawn) Doubles
    Winners : Mrs. Indira Prakash Shetty & Mrs. Anjali Ashok
    Runners-up : Mrs. Naina Arjun & Mrs. Jennifer Suares.
14. Men's Golf Singles (handicap) (Shaw Wallace Pink Lady Rolling Trophy)
    Winner : Ramneek Singh
    Runner-up : J.S. Grewal
15. Men's Golf (open) Wing Commander Sprott's cup)
    Winner : Dilip Thomas
    Runner-up : Gaurav Ghosh
16. Men's Golf Handicap Stableford (A.V. Thomas Stableford Cup)
    Winner : Ramneek Singh
    Runner-up : J.S. Grewal
17. Men's Golf Open Stableford (Nadicarianda Kuttaiah Memorial Trophy)
    Winner : Randeep Moitra
    Runner-up : Dilip Thomas

Inter-District Skit Competition
Winners : Minor Districts

UPASI-DSSC MEET — DSSC Commandant Maj. Gen. Gurpreet Singh at the mike. To his left is Mr. A. Ramesh Rao (President, UPASI), right Mrs. Vimla Abraham (President, UPASI Sports Club) and Mr. H.R. Ravi Kumar (Hon. Secretary, UPASI Sports Club)

Family Day : 3 Legged Race — Winners : Mrs. Gowri and C.P. Chengappa

UPASI President's Get-together
(L-R) Mrs. Ramesh Rao, Mr. A. Ramesh Rao (President, UPASI) Mr. S. Samuel (Vice-President, UPASI), Mrs. Leela Ravindran and Mr. D. Ravindran (Secretary General, UPASI).

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UPASI SPORTS COMPETITIONS - 1995

18 Veteran's Golf (Veteran's Challenge Cup)
Winner : Ranga Bedi
Runner-up : H.R.Ravi Kumar

19. Men's Inter-Dist. Golf (N.P.A Cup)
Winners : M.A. Appachu & M.A. Bopanna (Coorg)
Runners-up : N.Nagesh & Ranadeep Moitra (Nilgiris)

20. Men's Shuttlecock Singles (Sunny Deviah Trophy)
Winner : Ajoy Thipiah
Runner-up : Bipin Krishna

21. Men's Shuttlecock Doubles (Drawn) (Kodanaad Challenge Cup)
Winners : Prasant Bhansali & Sandeep Monappa
Runners-up : P.D. Ganapathy & Abraham Thomas

22. Shuttlecock Mixed Doubles (Drawn) (Shuttlecock Mixed Doubles Trophy)
Winners : Mrs. Indira Prakash Shetty & G.S. Thimmiah
Runners-up : Mrs. Vimla Abraham & J.T. Kamdin

23. Ladies' Shuttlecock Singles (Mary Henshaw Cup)
Winner : Mrs. Indira Prakash Shetty
Runner-up : Mrs. Savitha Chengappa

24. Ladies' Shuttlecock Doubles (Drawn)
Winners : Mrs. Savitha Chengappa & Mrs. Jaya Mohanraj
Runners-up : MS.Sangeeta Dasappa & Ms. Arachana Sadanand

25. Billiards (P.V. Cherian Memorial Trophy)
Winner : Jose Kallivayalil
Runner-up : Virendra Lal

26. Slosh (Cameron Challenge Cup)
Winners : M.A. Appachu & Harjinder Singh Kapur
Runners-up : V. Sivaramakrishnan & Subramani Rajubettan

27. Contract Bridge (Sunny Deviah Trophy)
Winners : R.S. Gokhale & N. Ramadurai
Runners-up : Dr.C.John Philip & M.N. Chengappa

28. Men's Squash Singles (Squash Challenge Cup)
Winner : Asgar Hussain
Runner-up : K.B. Chengappa

29. Shooting Competition for Men (Agromore Cup)
Winner : C.L. Suares (Jr)
Runner-up : Ullas Menon

30. Shooting Competition for Ladies (Agromore Cup)
Winner : Mrs. Thilaga Thomas
Runner-up : Mrs. Mita Paul.

31. SPORTS PERSON OF THE YEAR TROPHY
Winner : Mrs. Indira Prakash Shetty

32. Best District (Jaisri Trophy)
Winners : Nilgiris

33. Cricket - UPASI Vs DSSC (ICI Cricket Challenge Trophy)
Winner : UPASI

34. Tennis - UPASI Vs DSSC (Mohgul Monarch Rolling Trophy)
Winner : UPASI

35. Golf - UPASI Vs DSSC (A.C.Thimiah Plate)
Winner : DSSC

36. Squash - UPASI Vs DSSC
Winner : DSSC

37. Shuttlecock - UPASI Vs DSSC
Winner : UPASI

38. Hockey - UPASI Vs MRC (Ritz Challenge Cup)
Winner : UPASI

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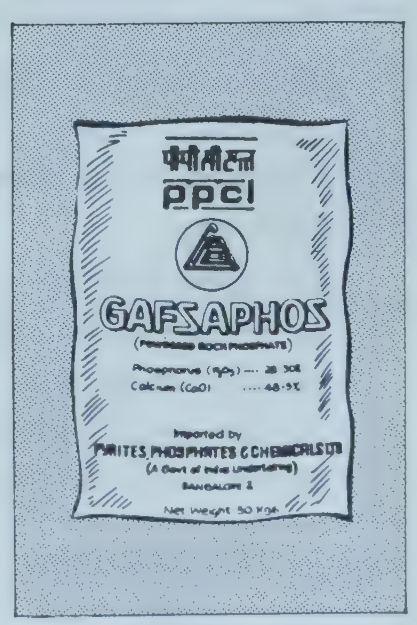

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NETT WEIGHT 25 Kg
WHEN PACKED

Contains :

*	Nitrogen (N)	3.73%
*	Phosphorus (P_2O_5)	3.64%
*	Potash (K_2O)	2.36%
*	Carbon (C)	17.70%
*	C/N Ratio	4.80%
*	Calcium (Ca)	5.07%
*	Sulphate (S)	1.29%
*	Iron (Fe)	1.48%
*	Copper (Cu)	0.21%
*	Magnesium (Mgs)	0.61%
*	Organic Matter	44.50%

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PERSONALIA

UPASI OFFICE-BEARERS

Mr. S. Samuel was unanimously elected President of the United Planters' Association of Southern India (UPASI) for 1995-96 at the 102nd Annual General Meeting of the Association held in Coonoor on 12th September 1995.

Mr. R.D. Vadera was elected Vice-President. The other members of the **Executive Committee** are : Messrs. K. Ahmedullah, M.H. Ashraff, Ajit Thomas, B.R. Bhansali, A.K. Bhandari, M.A. Bopanna, A.D. Chandrashekar, A. Jacob, K. Jacob Thomas, C.P. Kariappa, P.K. Kurian, C.S. Machia, P.K. Madhava Menon, P.S. Ponnapa, S. Ramakrishna Sarma, T. Rangaiah, A. Ramesh Rao, I.J.J. Rebello, E.B. Sethna, Shireesh Gurjer, J.K. Thomas, D.R.B. Tyman, D.A. Umapathy Gowda, K.P. Uthappa, M.M. Venkatachalam and P.S. Wallia.

Trustees :

Messrs. S. Samuel, R.D. Vadera, P.K. Madhava Menon, K.P. Uthappa, P.S. Wallia and A. Ramesh Rao.

Tea Committee :

Messrs. M.H. Ashraff, K. Ahmedullah, Ajit Thomas, B.R. Bhansali, P.S. Ponnapa, S. Ramakrishna Sarma, T. Rangaiah, E.B. Sethna, D.R.B. Tyman, M.M. Venkatachalam, P.S. Wallia, S. Samuel and R.D. Vadera.

Coffee Committee :

Messrs. I.J.J. Rebello, A.K. Bhandari, M.A. Bopanna, A.D. Chandrashekar, C.P. Kariappa, C.S. Machia, A. Ramesh Rao, D.A. Umapathy Gowda, K.P. Uthappa, S. Samuel and R.D. Vadera.

Co-opted Members : N. Bose Mandana, H.B. Jayaprasad, S.C. Kankani and M.D. Venkitasubramaniam.

Rubber Committee :

Messrs. K. Jacob Thomas, K. Ahmedullah, Ajit Thomas, A. Jacob, P.K. Madhava Menon, S. Ramakrishna Sarma, M.M. Venkatachalam.

Co-opted Member : George John.

Spices Committee :

Messrs. M.A. Bopanna, Ajit Thomas, C.S. Machia, E.B. Sethna, D.A. Umapathy Gowda, S. Samuel and R.D. Vadera.

Co-opted Member : Ram Kumar Menon.

Labour Liaison Committee :

Messrs. S. Samuel, T.K. Benjamin, P.K. Kurian, P.G. Prakash Shanker, P.K. Madhava Menon, P.S. Wallia, K.P. Uthappa and R.D. Vadera.

Tea Technical Committee :

Messrs. D.R.B. Tyman, K. Ahmedullah, M.H. Ashraff, A.T. Jacob, P.D. Jothikumar, P.S. Ponnapa, N.K. Rawlley, E.B. Sethna, P.S. Wallia, S. Samuel and R.D. Vadera.

Rubber Technical Committee :

Messrs. A. Jacob, A.V. George, K. Jacob Thomas, O.T. Jayachandran, K.A. Kuttaiah, P.K. Madhava Menon, G.K. Prakash, J.K. Thomas, S. Samuel and R.D. Vadera.

Taxation and Finance Committee :

Messrs. B.R. Bhansali, A. Jacob, R. Kalyanam, S. Mathew, V. Ranganathan, P.T. Rengarajan, Swarup Mitra, M.M. Venkatachalam, I.C. Warne, S. Samuel and R.D. Vadera.

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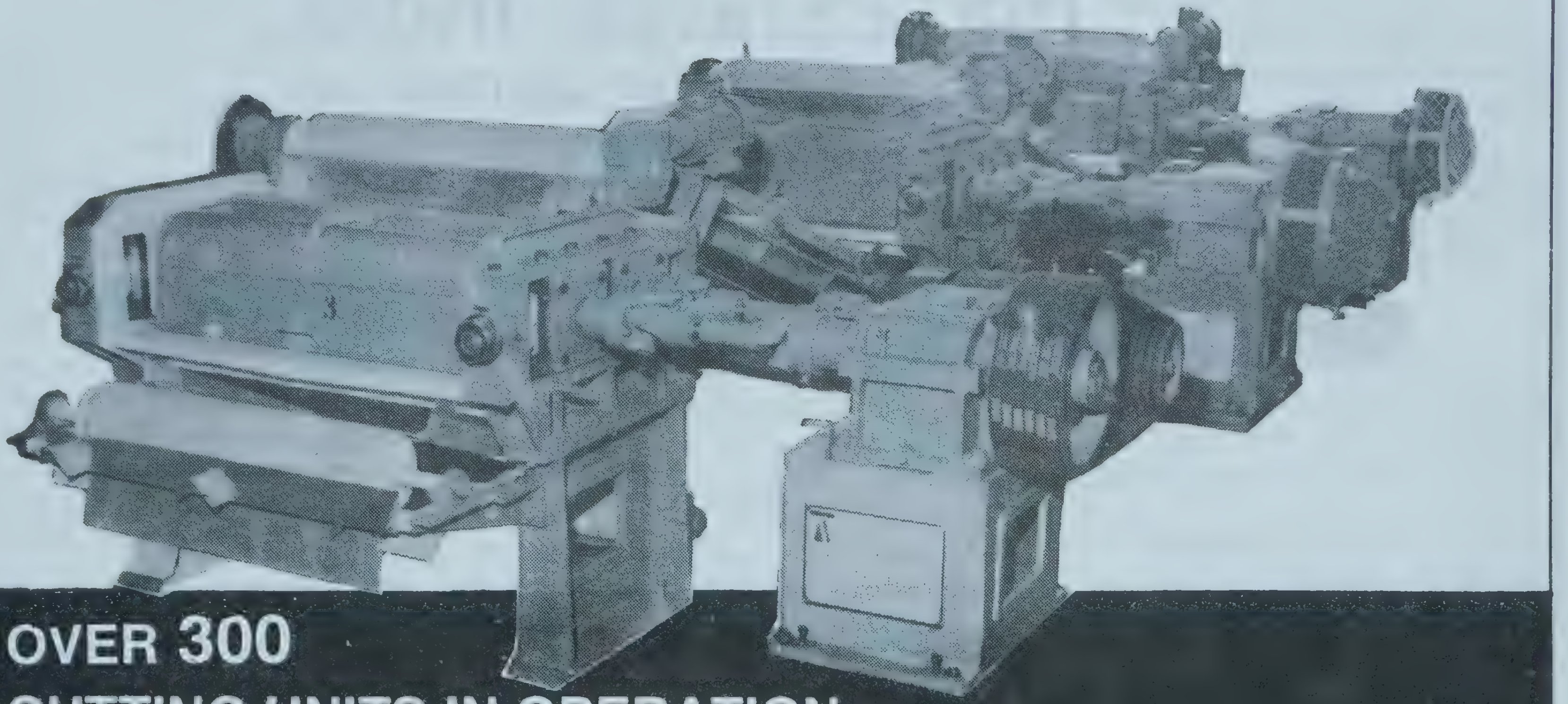

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UPDATE UPASI UPDATE UPDATE

(COVERS DEVELOPMENTS DURING SEPTEMBER 1995)

ANNAL CONFERENCE

The 102nd UPASI Annal conference was held in coonoor on 11- 12th September 1995. The main Conference on the 12th September 1995 was inaugurated by Mr. P. Chidambaram. Hon' ble Union Minister of state for Commerce. This was preceded by research sessions on tea, rubber, coffee and spices on the 11th at which Scientists from various Reasearch Institutes presented theme papers. The Chairmen of the Commodity Boards addressed the participants on the "Prospects and Problems of Plantation Sector in the Changed Ecnonmic Scenario". Mr. S. Venkitaramanan, former Governor of RBI delivered a talk on "Impact of Economic Liberalisation on Business". The Industrial Exhibtion was held, as usual, along with the Conference.

NEW COMMITTEE

At the Annual General Meeting held on 12th September 1995, Mr. S. Samuel, was elected the UPASI President for 1995-96 and Mr. R. D. Vadera as the Vice President. The Chairmen of the Various Committee are Messrs. M.H. Asharff (Tea), I.J.J. Rebello (Coffee), Mr. K. Jacob Thomas (Rubber), Mr. M.A. Bopanna (Spices), President (Labour Liaison) Mr. D.R.B. Tyman (Tea Technical), Mr. A. Jacob (Rubber Technical) and Mr. B.R. Bhansali (Taxation & Finance).

COMMITTEE MEETINGS

- Trustees : Coonoor; 10. 09. 1995
- Executive Committee : Coonoor; 10.09.1995
- Executive Committee : Coonoor : 12.09.1995
- Coffee Committee and Working Group on International Coffee Convention : Bangalore : 25.09.1995.
- Rubber Committee and Rubber Technical Committee : Cochin : 30.09.1995.

AGRICULTURE INCOME TAXATION

The tax burden on the plantation sector is very high compared to the industrial sector, since the rate of taxation under the State Agricultural Income Tax Acts are much higher than those under the Central Income Tax Act. The various facilities and incentives available for the industrial sector under the Central Income Tax Act for the growth and development of the industries are not available under the Agricultural Income Tax Acts. Before taking up the issue with the State Governments. it was felt that it would be useful to undertake a comprehensive study on the subject. Accordingly, the UPASI Executive Committee has commissioned M/S. Sridhar and Santhanam to undertake the study. Any suggestion from the members on the subject matter is welcome.

EMERALD HEIGHTS COLLEGE

In Accordance with the decision taken by the Executive Committee, the Managment of the Emerald Heights College, Ooty has been handed over back to the Nilgiris Educational Society by the UPASI Centenary Foundation.

COFFEE POOLING

During the course of the UPASI Annual Conference as also during the subsequent visitis to the coffee growing areas, the Commerce Minister had stressed the need for the coffee growers providing more quantities of coffee to the Coffee Board for market intervention. The Minister had suggested that the representative of UPASI may meet the Chairman, Coffee Board and work out an arrangement in this regard.

This subject matter was deliberated upon by the UPASI Coffee Committee at its meeting held in Bangalore on 25.09.1995. The Committee fully appreciated the concern expressed by the Minister and endorsed the need for making available more quantities of coffee to the Board. While considering the modalities, the Committee has proposed as follows :

- Since the picking of the 1995-96 season's crop is yet to commence, the Committee members felt that the time limit for receiving 1994-95 season's crop and accounting it in that year's receipts may be extended till 31st October 1995 along with the terms and conditions applicable for 1994-95 pool receipts.
- Alongside, the Coffee Board may continue the shceme of outright purchase. However, for the scheme to be successful, arrangements need to be made for making the payments immediately. It was also suggested that such outright purchases should be made both from those who have pooled as also from those who have not pooled.
- The scheme of outright purchase may be extended to cover all the grades instead of confining it only to Plantation C and Robusta Cherry AB alone, since adequate quantities of these two grades may not be available.
- Some of the growers have already cured and graded the coffee. With a view to enabling such growers also to pool, arrangements may be made to receive graded coffee also into the pool.
- As the scheme of market intervention is to supply coffee to the weaker sections of the society, the Coffee Board may persuade the State Governments to exempt from purchase tax the coffee procured under the scheme. It will be recalled that the Commerce Minister had also called for such a step. Accordingly, a letter has been addressed to the Chairman, Coffee Board and an appointment has been sought for a UPASI-KPA delegation to meet him. The Commerce Ministry has also been kept apprised.

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INTERNATIONAL COFFEE COUNCIL

India has been elected as the first Vice Chairman of the International Coffee Council. This is the first time that India, which was represented by the Coffee Board at the Council, is elected to the prestigious body. The election was held at the recent six-day meeting of the Council, which ended on 30th September.

WAGE RATES

Consequent to the adjustment of CPI-linked D.A., the wage rates payable under State-level settlements for the quarter October/December 1995 are as follows :

Daily Adult Wage (Basic + DA)

	Tea	Coffee	Rubber	Cardamom
	Rs.	Rs.	Rs.	Rs.
Kerala	42.00	42.00	46.05	41.60
Tamil Nadu	40.94	40.94	57.05*	40.94
Karnataka**	33.98	33.98	34.98	33.98

* From 1.8.'95

** From 1.4.'95.

PAYMENT OF BONUS (AMENDMENT) BILL, 1995

The above Bill to replace the Ordinance promulgated on 9th July 1995 has been passed by the Rajya Sabha on 8th August 1995 and the Bill will now be transmitted to the Lok Sabha for consideration. Despite strong protests from the employers, the Bill still contains the most objectionable provision that the amendment deemed to have come into force from 1st April 1993. In view of this, certain employers, under the aegis of the Employers' Federation of Southern India, have filed writ petitions in the Madras High Court challenging this provision of the amendment. In the writ petitions, a stand has also been taken that apart from 1993-94, even in respect of 1994-95, wherever accounting years have ended prior to the promulgation of the Ordinance on 9th July, there should not be retrospective operation and stay has also been prayed for.

EPF SCHEME - AMENDMENT TO PARA 26

At a special meeting convened by the Union Labour Minister on 23rd August 1995, the employers' representatives had highlighted the practical diffculties that will be encountered while complying with the amended provisions of Para 26 removing the qualifying service, particularly in respect of casual workers and contract labour. It was also strongly urged that the question of implementing the amendment retrospectively from 1990 should not be resorted to and as far as implementing the same in future, any alternative arrangement which is workable should devised. Mr. P.A. Sangma, the then Labour Minister, agreed to examine the request for waiver of payment of contribution for the past period in consultation with the Ministry of Law. As regards future, he stated that a simple procedure would be evolved so that employers are not put to unnecessary difficulties and the concerned workmen would also be able to really benefit out of the amendment. The final proposals of the Central Government in this respect are awaited.

Provident Fund - Withdrawal of 90 per cent of accumulations within 12 months of retirement - Exempted Establishments.

Consequent to the amendment to Rule 73 of the Income-tax Rules, 1962, providing for withdrawal of 90 per cent of the accumulations standing to the credit of a subscriber at any time within 12 months before the retirement, the Central Board of Trustees of Provident Fund has now permitted Exempted Establishments to avail of this facility, provided, however, their rules are amended to include this provision and the amendment has the approval of the Regional Provident Fund Commissioner.

TRAINING PROGRAMMES/ SEMINARS

A training on Nutrition; Health and Labour Management was organised for UPASI Glysdale workers on 5th September. Dr. Nirmala Srinivasan, Associate Professor, Indian Institute of Plantation Management, facilitated the training programme in the area of empowerment of farm work-force for higher productivity.

A three-day training on Upkeep of Plant Protection Equipment was organised for Estate Personnel from 25.9.95 to 27.9.95. Twenty three field supervisors and mechanics from various estates in Nilgiris participated in the training programme.

The Principal-cum-Chief Training Organiser of UPASI-KVK presented a paper on "Soil and Water Conservation for Nilgiris District" to NABARD officials in a Seminar convened at the Central Soil Conservation and Training Institute, Udhagamandalam on 29th September.

The following seminars/workshops are proposed to be organised by UPASI-KVK :

1. Eco-friendly cultivation of Tea : Mid November
2. Use of Renewable Energy Resources in plantation : 1st week of December
3. Organic Farming : Tea & Vegetable : January 1996.
4. Workshop on Cockshaffer Grubs in Tea & Vegetables : February 1996.

PERSONALIA

At the Annual General Meeting of the Association of Planters of Kerala held in Cochin on 30th September 1995, Mr. P.K. Madhava Menon has been elected as the Chairman and Mr. K.A. Kuttaiah as the Vice Chairman of APK for the year 1995-96.

☆ ☆ ☆

Mr. S.M. Datta, Chairman of Hindustan lever Ltd. as well as Unilever group of companies in India has taken over as President of the Associated Chambers of Commerce and Industry (ASSOCHAM).

UPDATE **UPASI Update** **UPDATE**

PRICE TREND (Rs./Kg.)

CROPS	LATEST		6 MONTHS AGO		YEAR AGO	
TEA	C.T.C.	ORTH.	C.T.C.	ORTH.	C.T.C.	ORTH.
COCHIN	41.18	45.00	38.19	42.04	33.09	37.92
COIMBATORE	42.83	46.24	33.95	41.02	28.71	36.30
COONOOR	42.28	39.97	34.57	31.96	25.65	27.78
AVERAGE	41.89	44.40	36.28	39.22	29.36	34.95
COFFEE						
ICTA Auction						
PLANTATION A	89.76		123.20		148.83	
ARA. CHY. AB	73.52		101.00		138.87	
ROB. CHY. AB	72.91		94.42		122.96	
RUBBER						
Kottayam						
RSS LOT	40.50		54.50		35.50	
RSS IV	41.75		55.00		41.00	
SPICES						
CARDAMOM	189.55		224.99		301.93	
PEPPER	81.75		74.00		67.50	
CLOVES	95.00		85.00		90.00	
NUTMEG	81.00		100.00		67.00	

TEA CROP - SOUTH INDIA

AUGUST **(TONNES)**
1995 : 14,029
1994 : 10,433
1993 : 10,656

JANUARY to AUGUST
1995 : 117,755
1994 : 122,213
1993 : 111,571

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We have no surplus to export rubber. But more important is the fact that we are not in a position to export rubber for various other reasons, apart from availability. Our tea export has come down. So also cardamom.

The case of coffee, as the brew, is a cheerful one. Export has been continuously going up. Almost 70 per cent of the production is now exported. However, as and when the price in domestic market goes up to the level perceived as unaffordable to the consumers by the Government, the threat of capping is there.

Somewhat stagnant production and raising home demand has led to drying up of export of cardamom. Pepper export has, of course, been going up.

On the other hand, Government is exhorting the plantation industry to produce more and export more.

That we have a vast domestic market for the above commodities is both a blessing and a curse. Blessing because we would always have a captive market for sufficiently large quantity of each of the commodities and that is a comforting thought for the planters. Curse, because in such a situation, the impetus to export is limited to the surplus from available production. Depending upon the match or mismatch of domestic production and captive demand, export levels are determined.

Government says that imports of tea and coffee are not allowed and hence Government and industry have an obligation to look after the consuming interests by providing them these commodities at affordable prices, at least to the weaker sections of the society. It follows therefrom that the export can't be increased to such an extent that it would increase the domestic price to a level determined by Government as "high".

Keeping the above perspective, capping of exports was put on Tea and Coffee at different times, reducing our credibility in the eyes of importers. The threat is still there.

The unspoken fear of planters is that if exports do not increase in tandem with production growth less demand growth, the domestic price will take a beating. Is not that cutting our own throats, some wonder.

For decades, the Government signed agreements with USSR and told the industry that the Government has got a contract for so much quantity of Tea and "you export". The price was artificial. When such a Government to Government contract takes place the attention to quality invariably gets reduced. And that happened in the case of Indian tea export to the erstwhile USSR. Meanwhile, other countries were doing business on business terms. Then suddenly the Government said 'you do business on business terms'. Shakled for 20 or 30 years, one is expected to compete in the marathon event.

Many countries have not such a vast domestic market as India. Hence they have to export or perish. Since nobody wants to perish, they sharpened their wits on export front. They had threat of import also, which still we don't have. So, they had to price the product at international levels. We still don't have that compulsion.

Our population is growing. Purchasing power is increasing. Hence, captive demand will also go up.

Such increased demand will have to be catered to at a price. But such increased demand would take care of the increase in production. Then how to increase exports.

In a three-year period, Government allowed, one after another, many commodities and manufactured items for import. Import duty rates are coming down. It would come to 20 per cent in no time. Planters are lulled by the assumption that what we produce should not be allowed to be imported.

But how the plantation commodities differ from other commodities? How long can Government resist the pressure to allow import, especially as India has joined WTO? Not long. Then what would happen.

There is also another danger. To capture the markets when the world production is surplus, attempts in various ways would be made including dumping. Not all dumping can be proved. What do we do then.

There is much gearing up that is required. What is seen is that the pace and vigour are slow. There is a shying away syndrome. Just as a large captive market is blessing and curse, the liberalisation process is also the same. We want liberalisation in respect of exports but not for imports. How could that be.

Yes, these are conundrums.

Yet, the past record of our exports and the quality level of products clearly show that we can cope up with the situation emerging. What is required is a change in the present mind-set.

Five years ago many of the commodities produced or goods manufactured were not exported. The feasibility of export of some and increasing export of others was questioned by many. Yet from Basmati rice to Maruti car and a host of other items, we are now exporting. Surplus production, independent export houses taking initiative to export an array of goods, conviction of many producers and manufacturers of their ability – and long-term need – to export, Government concessions to export, liberalisation of export procedures, etc. helped in this metamorphasis of our export scenario.

If others can do, so also the planters - should not we take that approach or challenge?

Tail Piece :

When we say 'allow free export but restrict import' we are in good company. Newspapers never miss a chance in admonishing industries for resisting imports. There are pontificatory editorials day in and day out. Competition bringing out the best, consumer being benefited, etc., are affirmed. But when it comes to foreign newspapers wanting to publish from India, newspapers holler at first levelling the playing ground. They imaginatively present the horrors in allowing that! ✪

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COVER FEATURE

NURSERY GRAFTING IN TEA

N. SATYANARAYANA and Ch. SREEDHAR*

Grafting fresh, unrooted clonal tea cuttings in the nursery, conceived and perfected by the UPASI Scientific Department, is recommended to raise composite plants comprising the shoot system of high yielding, quality tea clones and the root system of drought tolerant clones. The objective of grafting is to overcome drought susceptibility of the high yielding clones by grafting them on drought tolerant clones.

Performance of composite plants, both in the nursery and field, has always been superior to that of ungrafted plants of the respective clones used as scions. Parameters used for such an assessment include per cent success in the nursery, vegetative vigour of nursery plants, establishment in the field, reaction to drought in successive years after planting and yield data monitored over two cycles (Table 1).

Data on these parameters were integrated to evaluate the compatibility between clones. The degree of compatibility between a clone selected as the scion and a range of drought tolerant cultivars used as rootstocks varies with the combination. Such variations indicated the need to select those combinations that are relatively superior to others. On the basis of these assessments, we recommend the following clonal combinations for commercial adoption.

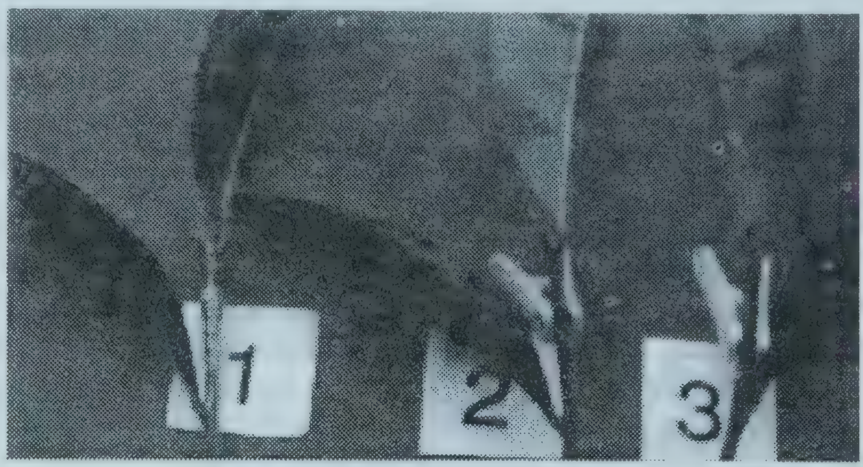

Fig. 1 : Graft Partners secured using 1) polythene strip and 2 & 3) plastic clips [2) cleft grafted and 3) sadde grafted cuttings]

Scion clone	Rootstock clone
UPASI - 3	UPASI-2, UPASI-6 and UPASI-9
UPASI-8	UPASI-2 and UPASI-9
UPASI-17	UPASI-2 and UPASI-9

The major elements of work involved in grafting are the preparation of cuttings using blades/knives, securing graft partners at the interface with a polythene strip and removal of polythene strips after graft union. These time-consuming and labour-intensive operations impose limitations on the output of the workers.

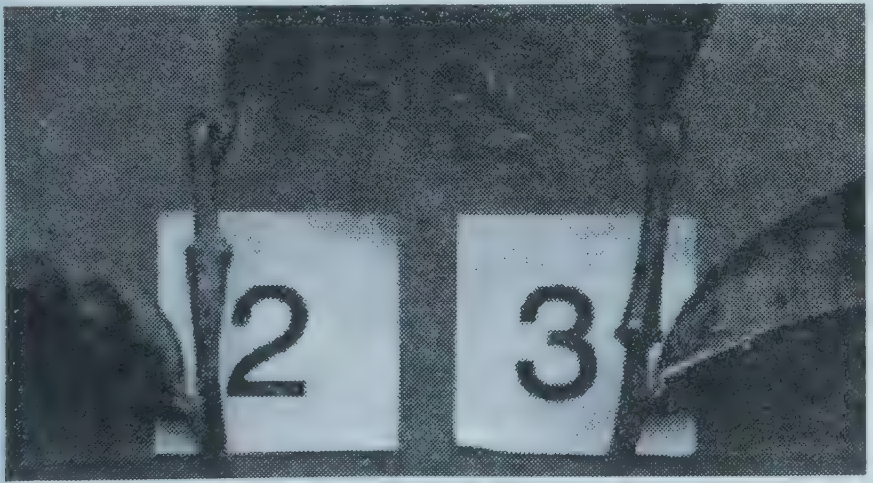

Fig. 2 : Callus formation at the graft interface in 2) cleft grafted and 3) saddle cuttings.

While attempts are being made to mechanise the preparation of cuttings, we have come across a promising substitute to the polythene strip used for securing the graft partners.

In a trial carried out recently, the usefulness of plastic clips to secure graft partners was investigated. Cuttings were prepared and held together at the graft interface using plastic clips (Fig. 1). Both cleft and saddle methods of grafting were tried. The standard for comparison was cuttings secured using polythene strips.

After six weeks from putting out the cuttings, clips and polythene strips were removed to examine the graft union. Quantitative information on graft take is given in Table 2. Callus formation at the graft interface is shown in Figure 2.

Plastic clips were as effective as polythene strips in inducing optimal callus formation at the interface leading to successful graft union in cleft grafted cuttings. There was a slight increase in callus formation in saddle grafted cutting which, however, did not influence the percentage of graft take.

---

* UPASI Tea Research Institute, Nirar Dam B.P.O., Valparai - 642 127.

Based on these results, it is now recommended to use plastic clips for securing graft partners. The plastic clips should be removed after six weeks from planting the cuttings, after ascertaining the union of graft partners.

Table 1 : Performance of grafted plants

No.	Parameter	*Graft			Clone		
		UP-3	UP-8	UP-17	UP-3	UP-8	UP-17
1.	Success in the nursery (%)	90	95	95	75	80	65
2.	Vigour of nursery plants						
	Shoot dry wt. (g/plant)	1.6	2.0	1.6	1.2	1.4	1.3
	Root dry wt. (g/plant)	1.4	1.6	1.4	0.8	0.9	0.7
3.	Establishment in the field (% survival)	95	95	92	80	85	80
4.	**Reaction to drought (% yield during the drought season)	22	23	22	17	19	17
5.	*** Yield (kg made tea/ha)	15,596	23,140	19,951	13,257	13,042	14,673

* Mean of the rootstock clones, UPASI-2 and UPASI-9 (UPASI-6 is also included in the case of UPASI-3 grafts)

** Average of all the years in the I and II cycles

*** Total of two cycles; I cycle 3 years, II cycle 4 years.

Table 2 : Per cent graft take

Material used for securing graft partners	% Graft take	
	Cleft grafting	Saddle grafting
Polythene strip	92	93
Plastic clip	95	94

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SPICES RESEARCH AND DEVELOPMENT :

— AN UPDATED OVERVIEW —

By

K.V. PETER*

Production of spices in India during 1993-94, showed increase in ginger, turmeric and cardamom. Reduction was recorded in pepper, chilli, garlic and large cardamom (Table 1).

TABLE 1 : Production pf Spices in India during 1992-93 and 1993-94 ('000 t)

Spices	1992-93	1993-94	% Increase / decrease
Pepper	54.90	46.10	-16.08
Cardamom	4.30	4.40	2.33
Large Cardamom	5.51	4.83	- 12.34
Ginger	189.40	199.39	5.27
Turmeric	397.40	659.80	66.03
Chilli	779.00	730.33	-6.25
Coriander	194.50	193.80	-0.004
Garlic	355.80	295.50	-16.95

Export of spices during 1994-95 showed an overall decrease (-12 per cent) in quantity and an increase in value in dollar (11.0 per cent) and in rupee term (Rs. 607.34 crores) (Table 2).

TABLE 2 : Export of spices from India during 1994-95 and percentage change over 1993-94

Spices	1994 - 95		% change over	
	Quantity (T)	Value (Rs. Lakhs)	Quantity (T)	Value (Rs. lakhs)
Black pepper	35636	22601.00	-26	22
Cardamom (small)	255	737.15	-25	-46
Cardamom (large)	1231	782.14	-30	-36
Chilli	26279	7625.41	-8	14
Ginger	11098	1505.44	-36	-38
Turmeric	28199	4459.22	12	-14
Coriander	10485	1712.18	—	—
Cumin	5253	2299.98	72	51
Celery	2547	762.41	-38	15
Fennel	1885	538.96	-25	-13
Fenugreek	7534	1147.04	59	65
Other seed spice	2528	496.21	41	25
Garlic	752	129.92	-72	-62
Other spices	13469	2429.53	-16	4
Curry Powder	3838	1350.14	7	4
Spice, Oils & Oleoresins	1608	7792.42	19	9
Mint Oil	1515	4364.07	27	93
Total	154112	60734.22	-12	11

Export during 1994-95 increased in value terms in pepper (22 per cent), cumin (51 per cent), celery (15 per cent), fenugreek (65 per cent), other seed spices (25 per cent), curry powder (4 per cent) and spices oils and oleoresins (9 per cent) over 1993-94 export figures. There was reduction in export of cardamom (-46 per cent), large cardamom (-36 per cent), ginger (-38 per cent), Coriander (-17 per cent), fennel (-13 per cent) and garlic (-62 per cent). Ninety three per cent of the export target in quantity and 11 per cent in value terms were realised during 1994-95 (Table 3).

TABLE 3 : Achievement of target in export of spices during 1994-95

Spices	% Achievement of target	
	Quantity	Value
Black Pepper	111	157
Cardamom (Small)	43	35
Cardamom Large	38	87
Chilli	96	109
Ginger	74	52
Turmeric	128	99
Coriander	60	74
Cumin	210	230
Celery	85	127
Fennel	86	98
Fenugreek	151	191
Other seed spices	169	165
Garlic	9	16
Other spices	67	61
Curry Powder	96	68
Spices Oils & Oleoresins	124	94
Total	93	111

Increasing trend in the export of spice oils and oleoresins continued this year also. World trade in spices in 1994-95 was 4.5 lakh tonnes valued US $ 1,500 million and India's share was 1.54 million tonnes (34.2 per cent) valued US $ 193.79 million (12.92 per cent) (Table 4).

---

* Director, Institute of Spices Research, Calicut - 673 012.

TABLE 4 : Vital statistics on spices

World trade in Spices in 1994-95	4.5 lakh tonnes valued US $ 1,500 million
India's export in 1994-95	1.54 lakh tonnes valued 193.79 million US $ (Rs. 607.3 crores)
Projected world trade in spices in 2001	6.25 lakh tonnes valued US $ 2200 million to US $ 3000 million
Projected India's export in 2001	2.0 lakh tonnes valued US $ 550 million

Export target of spices during 1995-96 is 1.71 lakh tonnes valued Rs. 667 crores (Table 5).

TABLE 5 : Export Target of Spices for 1995-96

Spices	Quantity (T)	Value (Rs. crores)
Black Pepper	35000	227.50
Cardamom (small)	600	18.00
Cardamom (large)	1400	8.50
Chilli	30000	85.00
Ginger	13000	16.80
Turmeric	30000	46.50
Coriander	12000	18.00
Cumin	5500	23.00
Celery	3000	9.00
Fennel	3000	7.50
Fenugreek	7500	11.50
Other seed spices	3000	6.00
Garlic	5000	5.00
Other Spices	15000	30.00
Curry Powder	4000	18.00
Spices Oils & Oleoresins	1800	100.00
Total	171250	667.30

Policy to boost production and export :

Spices districts, small farmers agri business consortium, Indian Spices Logo and Brand Promotion, Market Intervention and Special subsidies, reduced cess levied, technology mission on pepper etc. may boost up production during 1995-96 (Table 6). The VIII Plan targets a growth rate of 10 per cent in spices production compared to 4 per cent in VII Plan. Investment on spices production under central sector scheme was only Rs. 5.74 crores during 1991-92 and it is now Rs. 125 crores during 1992-1997 (VIII Plan). There is all round enthusiasm for spices production in the country. Upgradation of the National Research Centre for Spices into a full-fledged 'Indian Institute of Spices Research' indicates the firm resolve of the Government to boost up spices production and export.

Table 6 : Major Policy decisions which may boost up production and export of spices

	Policy decisions	Impact
1.	Spices districts (Wynaad and Idukki in Kerala)	Single window system for production and marketing. Concerted R & D efforts in selected districts.
2.	Small Farmers' Agri - Business Consortium (SFABC)	Production, value addition, quality, maintenance and market on cooperative basis. One district in each State.
3.	Indian Spices Logo and Brand Promotion	Maintenance and assurance of quality of Indian spices through standards and specifications.
4.	Market intervention	To maintain prices of spices from crushing down.
5.	Special subsidies	Promotion of export by bringing local prices at par or below international price.
6.	Reduction in cess	Reduction from present 2 per cent cess to 0.5 per cent on whole spices.
7.	Monitoring and coordinating body at the level of Planning Commission	To coordinate spices programmes under different ministries and departments.

Research attainments :

Considerable increase in productivity has been reported in research stations especially in pepper, ginger, turmeric and coriander (Table 7). The need is effective transfer of technology. Attempts are made to identify main production constraints and workout appropriate and economic strategies (Table 8).

TABLE 7 : Potential for productivity increase at the national level (kg/ha).

Crop	National	Progressive farmer	Research station	Abroad	
Pepper	290	2000	2445	2925	(Malaysia)
Cardamom	100	1625	450	200	(Guatemala)
Ginger	2421	5500	8250	—	
Turmeric	2738	6200	10700	—	
Coriander	476	—	1900	515	(Morocco)
Cumin	578	—	2000	—	

TABLE 8 : Main production constraints in spices

Spices	Constraints	Research attaintments
Black Pepper	*Phytophthora* foot rot	Management of the disease through a package of practices is standardised. Tolerant lines to the disease are developed. Bio-control is being tried.
	Stunt disease	No effective control measures except uprooting of diseased plants. Causitive organism is virus.
	Slow decline	Effective management method(s) are available except no source of resistance to *Radopholus similis* nematode.
	Low productivity	High Production Technology (HTP) is demonstrated.
Small Cardamom	'Katte' disease	Virus etiology is established. 'Katte' escapes are identified. 'Katte' tolerant lines are multiplied.
	'Vein clearing virus disease' or 'Kokke Kanthu'	Removal of diseased plants is advocated. No effective management measures are available. Spread has been checked by social action.
	Low productivity	High production Technology (HTR) is demonstrated.
Ginger and Turmeric	Rhizome rot	Causitive organisms are identified. Solarization of soil prior to planting is effective. Biocontrol is tried successfully.
	Bacterial wiit	*Pseudomonas solanacearum* is the casual organism. No resistant variety available.

So far, 9 high yielding varieties/hybrids in black pepper, 6 in small cardamom, 3 in ginger, 12 in turmeric, 13 in coriander, 5 in cumin, 4 each in fennel and fenugreek are released (Table 9).

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TABLE 9 : High yielding spices varieties released.

Spices	Hybrids (H) Varieties (V) released
Black Pepper (9)	Panniyur 1 (H), Panniyur 2 (V), Panniyur 3 (H), Panniyur 4 (V), Panniyur 5 (V), Subhakara (V), Sreekara (V), Panchami (V), Pournami (V).
Cardamom (6)	Mudigere 1 (V), PV 1 (V), CCS 1 (V), ICRI 1 (V), ICRI 2 (V), ICRI 3 (SKP 14) (V).
Ginger (7)	Suprahba (V), Suruchi (V), Suravi (V).
Turmeric (12)	Co. 1 (m) Krishna (V), Sugandham (V), BSR. 1 (V), Suvarna (V), Roma (V), Suroma (V), Rajendra Sonia (V), Suguna (V), Sudarshana (V), Ranga (V), Rasmi (V).
Coriander (13)	Gujarat Coriander 1 (V), Co.1 (V), Co.2 (V), Gujarat Coriander 2 (V), Rajendara Swati (V), Rer. 4 (V), Sadhana (V), Swathi (V), Co. 3 (V), CS. 287 (V), Sindhu (V), UD 20 (V), DH 5 (V).
Cumin (5)	S-404 (V), MC-43 (V), Gujarat Cumin-2 (V), Gujarat Cumin-1 (V), RZ-19 (V).
Fennel (4)	S-7-9 (V), PF 35 (V), Gujarat Fennel 1 (V), Col. 1 (V).
Fenugreek (4)	Col. 1 (V), Rajendra Kanti (V), RMt. 1 (V), Lam Selection.1 (V).

H - Hybrid, V - Variety, m - Mutant.

An exclusive nucleus seed multiplication programme to supply quality planting materials to farmers is under implementation. Research results are available on rapid multiplication through tissue culture of black pepper, cardamom, clove, nutmeg, cinnamon, ginger, and turmeric (Table 10). Bio-technological research has great potential in spices. (Table 11).

TABLE 10 : Methods of plant propagation in spices

Spices	Methods of propagation	Advantages
Black Pepper	Single hodded rooted cuttings using bamboo	Multiplication rate of 1 : 40 per year. Good anchorage due to presence of two root systems.
Cardamom	Trench method of sucker production	Multiplication rate of 1 : 20 per year.
Clove	Inarching on clove seedlings	Earliness, dwarfness and high productivity.
Nutmeg	Epicotyl graftin	Female plants are propagated.
	Top working	Conversion of male plants to female plants.
Cinnamon	Cuttage	Rapid multiplication of elite plants.
Cassia	Air-layering	Earliness, more plants per unit area.
Ginger and Turmeric	Crop rotation, solarisation and disease free rhizome	Management of rhizome rot.

TABLE 11 : Potential applications of plant biotechnology in spices

1) Micropropagation and rapid clonal multiplication of high yielding elite genotypes to generate adequate good quality and disease free planting materials.
2) Exploiting somacional variation and utilisation of techniques like somatic cell hybridisation , anther culture, embryo rescue etc. for crop improvement.
3) In vitro selection for resistance to biotic and abiotic stresses.
4) In vitro conservation and safe exchange of germplasm and
5) Production of flavour and volatile constituants in culture.

Salient achievements in biotechnology in spices include micropropagation and clonal multiplication in cardamom, black pepper, ginger, turmeric, cinnamon and vanilla (Table 12). In vitro selection for resistance to biotic and abiotic stresses especially rhizome rot in ginger is in progress.

TABLE 12 : Salient achievements in biotechnology in spices

Spices	Achievements
Cardamom	Clonal multiplication, field evaluation of tissue cultured plants, inflorescence culture, regeneration of plantlets from callus. Somaciones are evaluated.
Black Pepper	Clonal multiplication, callus culture and regeneration of plantlets, Micropropagatio of related spices of piper, piper longum, p.betle, P.colubrium, P.chaba.
Ginger	Clonal multiplication, field evaluation of TC plants in vitro rhizome, formation regeneration of plantlets from callus, in vitro selection, in vitro poluploidy, in florescence culture and in vitro development of fruit.
Turmeric	Micropropagation, plant regeneration from callus, Micropropagation of related spices and genera.
Tree spices	Micropropagation, in vitro proliferation of mace and synchesis of flavour components in culture.
Vanilla	Seed and embryo culture.

Quality maintenance in Indian spices :

India has a global monopoly in spices oils and oleoresins. During 1994-95, India exported 1608 tonnes of oils and oleoresins valued Rs. 77.92 crores against 1355 tonnes Rs. 71.49 crores during 1993-94. There are AGMARK specifications for various Indian spices and their value added products. The Bureau of Indian Standards has published a series of specifications to maintain and improve quality of Indian spices (Table 13). High curcumin lines in turmeric, high pipeline lines in black pepper, high essential oil lines in clove, cinnamon and nutmeg, etc. are in the pipeline at Indian Institute of Spices Research, Calicut.

TABLE 13 : Role of Bureau of Indian Standards to Improve Quality of Indian Spices

Standards approved and circulated	Details
Spices and Condiments Sectional Committee FAD.9 deliberated and approved several standards	IS 4404 : 1992 on cloves, IS 13474 : 1992 on Green Pepper; IS 13545 : 1992 on Garam Masala; IS 13446 : 1992 on Large Cardamom etc.

Environmentally Friendly Spices Culture :

Use of plant protection chemical leads to residual toxicity in spices products. Moreover, there is high premium for organic spices. Biocontrol of pests and diseases is another area where useful information are generated (Table 14). A fungus Trichoderma sp. in combination with VAM suppresses *Phytophothora capsici* causitive organism of foot rot in black pepper. Biopesticides to manage pests of spices are also developed.

TABLE 14 : Biocontrol of pests and diseases in spices

Spices	Pests/diseases	Biocontrol agent tried
Black Pepper	*Photophthora capsici*	*Trichoderma* sp. in combination with VAM.
	Scale insects	Natural enemies viz., *Encarsla* lounsburyl.
	Top shoot borer	*Apanteles cypris,* an important parasite.
	Pollu beetle	An entomophagous mite and nematode.
Cardamom	Rhizome rot and damping off	*Trichoderma* sp. and *Paecilomyces Lilacinus.*
	Root knot nematode	*Paecilomyces Lilacinus.*

The targetted export during 1995-96 is 1.71 lakh tonnes value Rs. 667.30 crores. Research and development activities are well tuned to achieve the above targets. The year 1994-95 also witnessed fall in quantity of export of black pepper, cardamom, chilli, ginger, coriander, celery, fennel and garlic. There was failure of pepper crop in Indonesia. Labour unrest at ports of export in India is still continuing. Unreliable and unsustained availability of spices for export continue to bother Indian exporters. The targetted production and export of spices during 1995-96 would be achieved subject to the stability in remunerative prices and the extent to which the above negative trends are reversed.

— **Paper presented at the Research Session on Spices held in UPASI, Coonoor, on 11th Sept. 1995.**

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THERMOPLASTIC ELASTOMERS AND THEIR INFLUENCE IN FUTURE WORLD ELASTOMER CONSUMPTION

By
Dr. E.V. THOMAS*

INTRODUCTION

Thermoplastic elastomers (TPE) are called elastoplastics. These polymers combine the processability of plastomers (eg. polyethelene, PVC) and functional performance of convensional elastomers (natural / Synthetic Rubbers). Unlike conversional rubbers, thermoplastic Rubbers need no vulcanisation and yet they show elastomeric properties within a certain temperature range. They can be processed on conventional plastic equipment such as injection moulders, blow moulders, entruders and so on. The transition from a processible melt to a solid elastomeric material is rapid and reversible. The elastomeric properties are developed immediately on cooling. These rubbers are steadily replacing vulcanised rubbers from a large number of applications.

Depending on definition used, a TPE may be classified as either a rubber or as a plastic. In terms of properties most TPEs are rubbers, in terms of processing they are thermoplastic. Thus, TPEs are claimed by both rubber and plastic industries. TPEs have one foot in the rubber industry and the other in plastic industry.

The Continuing success and increasing acceptance of TPEs as a replacement for thermoset rubber, and to a lesser degree plastics and metals, is becoming a global phenomenon (IRSG. 1994).

ADVANTAGES

The practical advantages of thermoplastic elastomers in comparison to vulcanised rubbers are listed under :

1. Little or no compounding is required. Most TPEs are "ready to use" materials thus eliminating the batch to batch variations of convensional rubber compounds as well as the high energy consumption during mixing and vulcanisation.
2. Injection moulding cycles are very fast, leading to lower finished part costs.
3. The scrap can be easily re-cycled, whereas the scrap of vulcanised rubber is usually discarded, because it is difficult to re-cycle.
4. Most TPEs have lower density.
5. Product consistency is better than comparable vulcanised rubbers.

TPEs have certain disadvantages also like higher compression set, lower thermal stability, poor performance at high temperature applications (TPEs melt at high temperature) etc.

TPE GROWTH

Growth in consumption of TPEs for the period from 1970 to 1993 is given in Table-1 below :

Table 1: Growth in consumption of TPEs

Year	TPE Consumption Tonne
1970	1,50,000
1985	5,00,000
1990	6,00,000
1993	7,70,000

This reflects a compounded annual growth rate of 8 per cent in contrast to a 0 - 2.0 per cent for the non-tyre segment of the rubber industry and 1 - 3 per cent for the plastic industry.

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* **Director (P & PD), Rubber Board.**

From considrations of predictions by various agencies on world-wide usage of TPEs it is concluded that this segment of polymer industry will have a growth rate between 5 to 8 per cent during the years 1994 to 2000. Projected consumption of TPEs is given in Table II. (European Rubber Journal 177, 5, p. 24 (1995).

A recent assessment by experts put the current global market for TPEs at 1.6 billion US $ which is nearly double the value of natural rubber produced in India. According to Jean Stemper TPE growth rate during 1994 to 2000 will be 8.5 to 11 per cent. He estimates a consumption of 1.7 million Tonnes of TPE by 2000 (IRSG - 1994). A study of the North American TPE market by the Freedonia Group Inc. (A group specialising in projections on industrial products). Styrene based TPEs will remain dominant till the year 1997 and after this very fast growth will be shown by Olefinic TPEs and Co-polyester type TPEs. Freedonia projection of TPEs by Tyres is given in Table III.

Table III : TPE Types

Type of TPE	1992 '000 Tonnes	1997 '000 Tonnes	Annual growth Per cent
Styrenics	134.2	159.2	3.5
Olefinics	74.9	112.0	8.4
Urethanes	34.0	44.5	5.5
Polysters	26.3	40.4	8.9
Other types	20.4	29.5	7.6
	289.8	385.6	5.9

Foot-wear, a major market for styrenic TPEs, will remain flat in North America as a result of competition from imports. Strong demand in olefinics is expected in products like automotive bumpers.

IMPORTANT CLASSES

TPEs are classified into six major classes. Styrene block co-polymers (SBCs) Thermo plastic olefins (TPOs), Elastometric alloys (EAs), Thermoplastic poly urethanes (TPUs), Co-polyster elastomers (CoPEs), Thermoplastic Co-poly amide elastomers (PEBAs). Thermoplastic natural rubber and blends of PVC with elastomers also are marketed as TPEs.

Table II : GLOBAL TPE USAGE (000 Tonnes)

Region	1993	1994	1995	1999
Western Europe	285	299	314	371
North America	320	358	387	496
Latin America	9.3	12	18	24
Asia/Pacific	138.0	148	154	179
CIS	9.0	10	30	110
Middle East/Africa	5	5.5	5.9	7.7
Total	766	833	909	1188

Styrene block Co-polymers (SBCs) : Three distinctly different types are included under this. The trade names of important varieties are Kraton D (USA) and Cariflex TR (Europe). Styrene butadiene Styrene (SBS) is generally classified as a low cost product. It has significantly displaced natural rubber and SBR in foot wear application. It is also used in bitumen and polymer modifications. Styrene isoprene styrene (SIS) is the material of choice for adhesive systems. In addition to hot melt adhesives, it has significantly displaced many rubber based adhesives.

Styrene ethylene butylene styrene (SEBs) is a more saturated TPE than SBS. So these materials are more resistant to Oxidative attack and more suitable for higher temperature applications in comparison to other TPEs. This styrenic is likely to show more growth in future.

TPOs

In general TPOs are simple blends of a thermoplastic such as polypropylene with an unvulcanised elastomer such as EPDM. During mixing of rubber with plastic the rubber is vulcanised using suitable additives. Since the rubber segment is vulcanised in-situ during mixing with poly propylene the cured rubber particles gets dispersed in the continuous matrix of polypropylene. They are also called elastometric alloys. They have good resistance to air oxidation and Ozone. Important commercial grades are Santoprene (blends of EPDM / Polypropylene) Geolast (blends of NBR/PP) and Alcryn (blends of Ethylene Vinyl acetate and vinyledene chloride). Thermoplastic natural rubber also can be included under this group (TPNR). Normally TPNRs are produced by blending natural rubber with certain grades of poly propylene. The properties of TPNR and its economics compares favourably with EPDM/PP based TPOs. TPNR can be used in the same way as these Thermoplastics for producing products like automobile bumpers. TPNRs of widely varying properties with various NR/PP ratio are also available for use in different fields of applications.

TPUs

Thermoplastic Urethanes are in market for the past 30 years. The thermoplastic poly urethane elastomers are block copolymers with amorphous and crystalline segments. Two types of TPUs are commercially available. One is Polyether Urethanes and the other polyster based Urethanes.

Polyamides (PEBAs)

Poly amides are the latest and best performing TPEs. They are block Co-polymers with hard and soft segments which are connected by amide linkages. This special structure gives them better Chemical resistance in comparison to other TPEs. For producing them a polyethene diol is allowed to react with a dicarboxylic poly amide. Unlike other TPEs they have good high temperature resistance and in some applications they can replace Silicone rubber and fluro elastomers.

APPLICATIONS OF TPEs

Automotive :

The automotive industry provided the most important market for TPEs. The lower-performing TPEs find use in exterior and passenger compartment applications, whereas the higher performing TPEs are used in under the hood applications. Automotive air intake hoses are manufactured using TPEs. Automotive bumpers is another important product. The global 1994 market for bumper materials is 1 million tonnes. TPEs are now the preferred materials in bumper manufacture. Poly Urethane based TPUs were popular in this area till recently. Use of thermoplastic rubbers in air bag covers, boots and cables of automobiles will grow in all developed countries. Window seals also will graudally be produced from TPEs. Axle boots is one item now produced from TPEs, because of the special properties and processing advantages of TPEs new designs are given to axle boots which in turn improves vehicle performance and service life.

Construction uses :

TPEs are used in construction applications for the past ten years or so. The use is mostly in door and window seals. They are also used in producing attractive cupboard handles.

Home appliances :

TPEs are used in various house-hold articles, like dish washers, washing machines etc as gaskets. Their improved chemical resistance and weathering make them more attractive in these applications than convensional rubbers.

Electronic, electrical and medical applications of these polymers are also substantial. They are preferred in medical applications as they are cleaner than thermo-set rubbers and they contain fewer residual chemicals from processing. They are also biocompatible and are generally inert to blood, tissue and other body fluids. The products of TPE in medical field include syringe stoppers, Catheters and hospital tubings.

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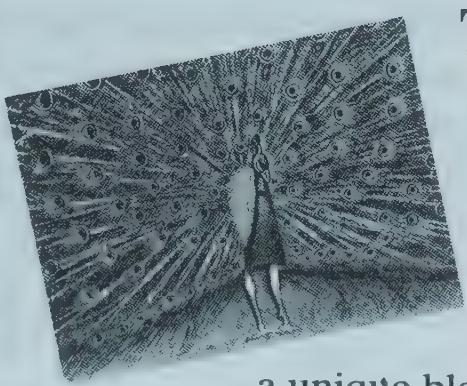

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Future of TPEs and their competition with convensional rubbers :

Selection of polymer for product manufacture is based on its cost and ability to yield products that meet the service requirements. Thermoset rubbers were the polymer source for non-tyre rubber produce manufacturers till recently. The introduction of TPEs have changed this scenario. Many manufacturers are trying to replace Natural/ Synthetic rubbers using TPEs in non-tyre rubber products. Components of TPEs are preferred to rubber based components by many automobile manufacturers mainly on considerations of system cost factor.

TPE growth rate annually is projected at around 8 to 10 per cent till the year 2000. This would mean that by the year 2000 almost 1.2 million tonnes of TPEs will be used in industry. Almost all the TPE use is now in non-tyre rubber product sector. Annual growth rate in this sector is 0-2 per cent even during very favourable times. So TPEs will reduce the consumption of vulcanisable rubbers in non-tyre rubber products like automotive bumbers, axle boots, under the hood cables, Shoe soles, hoses, tubing insulation and jacketing of wires and cables. Solvent based and hot melt adhesives, toys etc. From the various growth projections it is estimated that TPE use will reach a level of 1.2 million tonnes by year 2000. At this level of consumption this new polymer will account for around 20 per cent of rubber use in non-tyre product manufacture. It is estimated that 65 per cent of TPEs used will be direct replacement of thermoset rubber compounds. Ten per cent of TPEs will be in areas where softer plastics were used. The remaining 25 per cent will be in new products requiring rubber like properties. This would have been growth areas for thermoset rubbers had this alternative polymer been not developed. Thus growth of thermoplastic rubbers will reduce consumption of thermoset rubbers in many non-tyre products manufacture. Introduction of thermoplastic rubbers thus will reduce growth in consumption of both natural and Synthetic rubbers.

Rubber based composites :

The mechanical properties of elastomers can be improved by adding reinforcing ingredients such as Carbon black and Silica. Recently it is reported that addition of a suitable short fibre can also improve mechanical properties of rubber. Fibre reinforcement of elastomers is already known in rubber industry. In products like tyres, belts, hoses and certain gaskets reinforcement by use of continuous fibres is well known. The extent to which discontinuous fibres can approach the performance of a continuous cord depends on its modulus relative to that of the matrix. Performance of a short fibre rubber composite depends on several factors, such as high aspect ratio of fibre (average length to diameter ratio), control of fibre orientation, generation of a strong fibre rubber interface, high state of dispersion of fibre in rubber and optimum quality of rubber compound.

In products such as conveyor belts and tyres elastomers reinforced with continuous cords are used. The cord rubber composite remains quite flexible both paralell to the direction of major reinforcement and more specially in the normal direction. Here the reinforcement does not alter rubber properties appreciably and the cords are free to slide past each other as the parts are flexed.

On the other hand reinforcement by short fibres offers several advantages like ease of fabrication, better economics at mixing and fabrication stages, high green strength, reduced and controlled shrinkage in moulded products, improved solvent resistance, better thermal ageing and improved cut and tear resistance. The manufacture of complex shaped engineering article is

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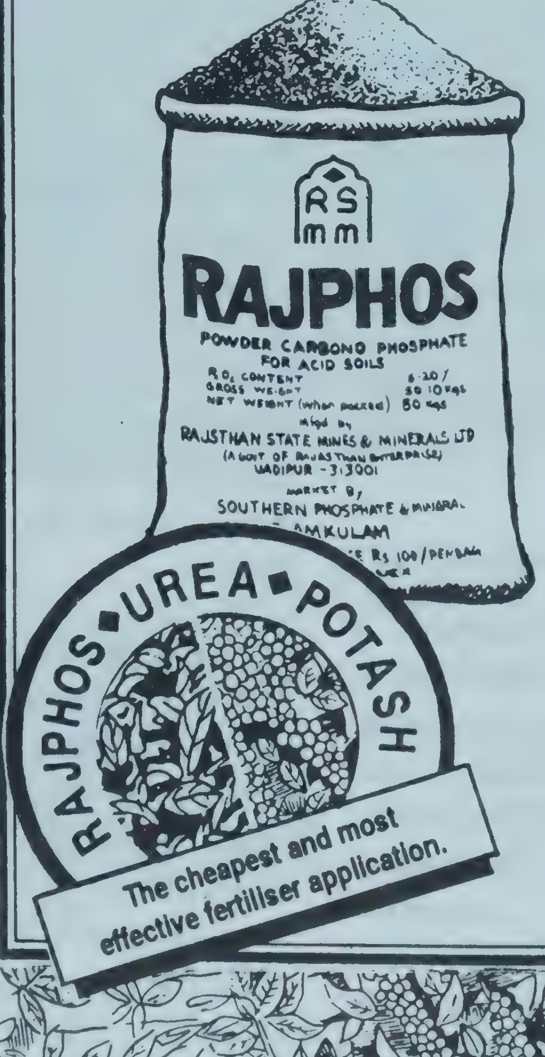
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easily accomplished with short fibre composite which is not possible from elastomers reinforced with continuous fibres.

Short fibres can be incorporated directly to rubber compound along with other additives and the compounds are amenable to convensional rubber processing operations such as extrusion, Calendering and moulding. Well dispersed short fibres reinforce the rubber phase uniformly. The performance properties of short fibre-rubber composites depend on the bonding between fibre and rubber. For improved bonding fibre surfaces are modified by chemical treatment or bonding agents are added. RFL and hexa-methylene tetrammere based resins are used as bonding agents.

Some of the fibres used in rubber industry are cellulose, glass, asbestose, jute and nylon. The proportion of fibre to rubber in these cases is high and rubber acts only as a binder. Aramid fibres are also now available for incorporation with rubber matrix. This aramid Slurry is marketed by Akso-nobel company.

Various type of short fibres are used in thermoplastic elastomers also for reinforcement. Glass fibre, Carbon fibre and cellulose are used to reinforce TPEs. It is likely that TPE/fibre composite will slowly make an in road into Tyre industry. Main use of TPEs currently is in non-tyre rubber products. The availability of versatile TPE/Fibre composite can change this scenario. It may then be possible to produce even tyres by injection moulding. Such a development in Technology may not sound well for the rubber producing industries. So the rubber producing industries should carefully evaluate these technological developments and evolve strategies for improving the competitive position of the rubber produced by them.

— Paper presented at the Research Session on Rubber held in UPASI, Coonoor, on 11th Sept. 1995.

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WATER MANAGEMENT IN COFFEE

K.V. KESHAVAIAH*

Coffee is a commercial crop which earns lot of foreign exchange to our country. Coffee is grown in the hilly terrain where water management is a problem. Coffee area under irrigation is rather negligible. Except for irrigation of coffee for blossom, coffee irrigation has not attained much importance. Considering the pattern of rainfall in the coffee growing tracts, thrust should be given for water management since the coffee growing areas receive more than 80 per cent of the rainfall from June to October, i.e. both the South-west and North-east monsoon. From December to April they suffer, from severe moisture stress condition. In the rainy season the moisture conservation practices have to be adopted for life saving irrigation and blossom showers. Judicious use of this water is very important as water is very scarce during summer season which eventually coincides with blossom time also. Irrigation scheduling will go a long way in achieving this objective, as by this practice more area could also be brought under irrigation by the water practice more area could also be brought under irrigation by the water saved.

Irrigation scheduling is a process by which the timing and amount of irrigation water are determined. In simple terms — when to irrigate? and how much to irrigate?

Considering the peculiarity of the situation under which coffee is grown, where, at times, it is subjected to heavy monsoon showers and severe water stress situation in summer, water management attains much importance. In coffee, the quantity and timing of blossom and backing showers determine the yield in a particular year.

It has been estimated that a minimum quantity of 40 mm of water is required for forcing the blossom during Feb-March and a backing shower of 50-75 mm a month later. Under these conditions there will be concentrated flowering and the fruits will mature to harvest at a time. If the rainfall is inadequate and untimely, it is here that sprinkler irrigation will come to the rescue of the planters to simulate the natural conditions. Water mangement on the estates will play a vital role in these circumstances. It is also important as more than 80 per cent of the rain water is lost as run-off in the monsoon rains.

Some of the water management practices are listed below :

1) Contour planting : Taking up planting on the contour lines i.e., the contour lines are the lines of similar elevation.

2) Trenching : Trenches of 50 cm width, 25 cm depth and of any convenient length may be dug. Ideal time for this would be Sept-Oct. as the soil is fairly easy to work.

3) Terraces : In places of extreme gradients, terraces can be formed. The width of the terraces depend on the spacing given. Inter-terrace space can be utilised to grow some leguminous cover crops.

4) Scooping : Small scoops can be made in between plants across the slope for maximum infiltration of rain water and better treatment of the catchment.

5) Shade : Maintenance of proper shade will be having multifarious effect on the growth and yield of coffee including its effect on soil and water conservation. Shade trees will interfere with the beating effect of rain water, thereby reducing soil erosion, apart from its effect on flowering behaviour.

All these practices will facilitate better infiltration of water and the excess run-off water can be stored at the down stream of the estate as farm pond. This water can be utilised for blossom irrigation or life saving irrigation on priority basis. Considering all these factors, watershed approach is gaining popularity among agricultural scientists and policy-makers all over the world.

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* **Assistant Agronomist, RCRS, Coffee Board, Chundale - 673 123, Wayanad.**

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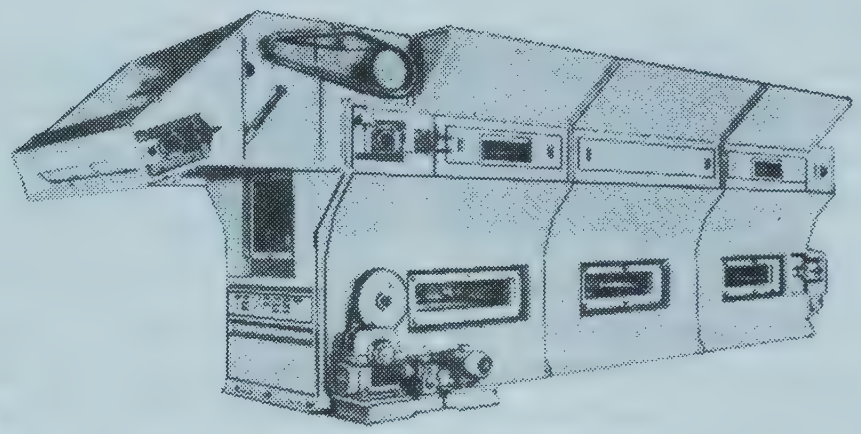

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BARRIERS IN ADOPTION OF AGRICULTURAL PRODUCTION TECHNOLOGY FOR ENVIRONMENTAL MANAGEMENT

Dr. V.G. DHANAKUMAR *

To foster an environment for excellence in conservation is one of the fundamental goals of the United Planters' Association Southern India — Krishn Vigyan Kendra (UPASI - KVK). This attention is being focussed on how food safety is influenced by the use of agriculture inputs; and how human health is influenced by agri-chemicals and nutrients in surface and ground water. Acknowledging that there is a "human" component to environment management establishes the foundation for a more specific premise.

BARRIERS IN ADOPTION :

Muraleedharan (1995) pointed out that increasing concern on the use of pesticides in tea field, both from the point of view of consumers of tea and workers operating in the field, there are demands to reduce the pesticide and nutrient in the field. This subject has become a hot topic in the tea planting industry and tea research institutes. However, answering the question of why farmers adopt agricultural production technology for environmental management is elementary and apparent; new agricultural production technology are adopted when the techniques are perceived as being in farmers'best interest. Almost everyone, planters included, would agree with this basic premise. Yet disagreements arise when asking the more interesting and challenging question : Why don't farmers adopt new agricultural production technology, such as **Nutrient and Pest Management (NPM")?** The NPM is a complex set of behaviour, decision-making procedures, methods, technology and values organised to provide efficient alternative (eco-friendly) methods of pest and nutrient management to farmers.

LOOKING TO THE FUTURE :

The future of the production technology appears bright for regenerative, organic and other forms alternative agriculture. David Ehrenfeld (1987), discussed the connection between the lives of mountain sheep and sustainable agricultural innovations (e.g., NPM). He talked about how the sheep live in very high, rocky and extremely steep places — a dangerous environment for a lamb to be born into. Biologists studying these sheep have observed how important it is for lambs to learn from older sheep how to negotiate the rocks and crevices. In fact, experiments have been performed when some lambs were hand raised, away from the older sheep and subsequently released into the same environment as lambs raised in the wild by their parents. Sadly, the human-raised lambs had extremely high mortality — they fell off the mountain. The experience of the older sheep passed on to the younger sheep was essential for survival.

This is how agriculture has been for most of history — older, experienced farmers passing on their knowledge and techniques to younger farmers. With modern agricultural science and technology, and its corresponding compartmentalized approach, however, we seem to have ignored this knowledge gained by experience and years of trial and error. And now that the number of farmers seeking environment management restoration and reduced reliance on petrochemicals is increasing, one obvious source of information and practical, local knowldge of agriculture is other farmers who have been following in the tradition of land stewardship and socio-economic profitability for many years.

Lin Compton (1991) suggests that agricultural education worldwide acknowledges only what is written in referred journals, that is, research institute-generated, test-plot knowledge, almost to the exclusion of knowledge that evolves from the practical experiments and experience of farmers in a whole-farm setting. The result is a tremendous incapacity to observe, listen, and learn from farmers. Times are changing, however, and there is a strong move to involve farmers/planters in setting the agricultural research and education agenda (Francis et al 1990, Gardner 1990, Janke 1990, Lockeretz 1990, Sauer 1990, Thomson 1990, Watkins 1990 and Dhanakumar 1993). John Luna (1990), an entomologist, says "Extension

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* **Principal and Chief Training Organiser of the UPASI-KVK, Coonoor 643 101.**

(and research institute agricutural universities) must completely change their orientation from this center of knowledge filtering down, to turn in the other way around." In order to reduce the barriers in adoption of agricultural production technology, a creative approach and collaboration is needed to integrate the best of farmer-based and research institute university-based knowledge (farmer-based, long term knowledge gained through farming, trial and error, and familiarity with the land and university-based, more specific or component, research knowledge gained from test plots, controlled conditions, and laboratory work. The former is almost necessarily holistic in perspective, and the later is traditionally reductionistic) to agricultural knowledged systems.

While disagreements exist, it is the answer to this latter question from which strategies must be built to help farmers make decisions that are economically, agronomically and environmentally sound. Consequently, answers to the questions of why farmers don't adopt must serve as the basis for increasing adoption. Efforts to increase the rate of adoption of integrated pest/national pest management systems must be based on understanding why farmers reject new production technologies.

UNDERSTANDING

In order to understand why farmers don't use production technologies, it is useful to examine how farmers adopt innovations. What happens once the idea reaches a farmer? How does an individual proceed to make decisions about how the idea relates to their farm operation? We know that an individual goes through a series of stages when deciding whether to adopt a new practice (Beal and Bohlen 1962). First, the individual either becomes aware of some problem and begins to search for technology to solve it; or he/she becomes aware of technology and begins to realize its problem-solving potential. This is often called the awareness stage. Second, the farmer begins to gather the necessary information to evaluate the technology in terms of his perceived needs. This is referred to as the evaluation stage. If the information is adequate and if the evaluation is positive, the farmer will probably try the technology on a small scale basis. If this trial stage produces enough beneficial results, then he/she can possibly move toward full-scale adoption. During this adoption stage the operator may either modify the technology or adopt his operation to increase overall efficiency.

As the farmer gets closer to fully implementing an idea or practice, information must become more focussed to the practical application of the idea on that farm. Copp et al (1982) generally confirmed that as farmers progress along the adoption process, they seek more practical and applied information. In this line Nowak and Korsching (1983) believes that we need to understand the voluntary adoption of new innovation before debating the merits of regulatory strategies. Why don't more farmers voluntarily adopt new innovations? He keeps the general idea of the adoption process stage, transforming the adoption stage to adaptation.

OBSTACLES

Being unable to adopt a new production technique implies the presence of an obstacle or situation where the decision not to adopt is rational and correct. The farmer is making a sound decision in rejecting a production technology system because of this obstacle. The important point is that the farmer may be willing to adopt the practices, but for one or more of the following reasons is unable to make this decision.

In this line, Peter Nowak (1992) suggests that the non-adoption of new agricultural production technologies can be classified into two general categories; those unable to adopt and those unwilling to adopt. These are not mutually exclusive categories. Within these two general categories are 16 reasons why farmers are either unable and/or unwilling to adopt.

A. UNABLE TO ADOPT :

1. Information is lacking or scarce.
2. Costs of obtaining information are too high.
3. Complexity of the practice is too great.
4. Too expensive of new practice.
5. Labour or management requirement are excessive.
6. Planning horizon is too short.
7. Availability and accessibility of supporting resources is limited.
8. Inadequate managerial skills.
9. Little or no control over the adoption decision.

B. UNWILLING TO ADOPT :

1. Information conflicts or in consistency
2. Poor applicability and relevance of information
3. Conflicts between current production goals and the new practices.

4. Ignorance on the part of the individual or promoter of the new practice.
5. Practice is inappropriate for farming systems.
6. Practice increase uncertainity of risk of negative outcomes.
7. Belief in the traditional practices.

For example, in response to NPM the important constraints to use have been categorised as technical, financial, educational, institutional, economic, social (Wearing 1988 and Zalom 1989), cultural, environmental (Corbet 1981), innovation complexity (Grieshop et all 1988), organisational and human elements (Grieshop et all 1990). Review of the foregoing studies allows an assessment of the state of the art in research concerning factors affecting the actual adoption related to appropriateness, accuracy and extent of agricultural production technology.

WHAT'S AHEAD

Looking 50 years into the future, from an alternative agricultural perspective :

* Economic pressures on both farmers and buyers of commodities, especially those overseas, will continue to push agriculture toward lower cost alternatives. Fertilisers and pesticides will become too expensive for many farmers to use.

* Genetic engineering will begin influencing agriculture in 10 years or so, but agriculture's biological structure will be influenced more by alternative methods, many of which are tested and in use.

* Pollution caused by agriculture will become such a pervasive problem that laws restricting use of fertilisers and pesticides will become common.

* The information revolution will give farmers the tools to substitute knowledge for artificial inputs much more effectively.

* Agriculture will be shaped by the needs of other sector. The high costs of treating chronic diseases among a population of largely aged people will cause prevention to become the main health strategy. When health is seen mainly as a challenge of prevention, then agriculture and the food it produces will become a prime tool to create health. Provision of good nutrition for Indians will become the main goal of agriculture.

* Finally, the conservation movement will be re-shaped into a movement to restore and regenerate not just the soil but the craft of producing good food while improving agriculture's resource base.

Will alternative agriculture still exist? Yes, but those working under that label will not be the innovators. What is today alternative will become common place. What is conventional today will become the alternative.

CONCLUSIONS

In summary, one can make at least three general observation from the foregoing lists of why farmers unable or unwilling to adopt agricultural production technologies such as NPM.

First, increasing the adoption of NPM or any new technology depends upon addressing reasons why farmers are unable to adopt. Once these impediments are removed, then it is a question of persuading the farmer who is unwilling to adopt.

Second, many of the factors to be unable or unwilling to adopt are beyond their control. Blaming the farmer for not adopting a production technology is not only erroneous in many cases but also hypocritical. Instead of always focussing on the farmer, more attention needs to be given to understanding and addressing the many reasons why farmers are unable or unwilling to adopt. In many cases it is not so much a "farmer failure" as it is a "systems failure".

Third, a "shotgun" approach to using technical, financial, or educational assistance is not the answer. Instead, considerably more effort needs to be spent trying to understand the reasons why a farmer may be unable or unwilling to adopt. Based on that understanding, one must be able to deliver the specific type of assistance the farmer needs in a format compatible with his or her capabilities.

Instead of using only "educate, regulate, or bribe" tactics, we must begin to spend more time and effort trying to understand all of the complex reasons why farmers are unable or unwilling to adopt new agricultural production technologies such as NPM. Otherwise our aspiration for widescale adoption of production technology and management systems are destined to fail. The farms of the future will be based on agricultural production and management systems. How long it takes us to get there will depend on our ability to overcome the obstacles to adoption of agricultural production technology.

IMPLICATIONS

Educational programmes for farmers should be developed to capitalize on the interest focussed on environmental management and barriers in adoption of technology. Demonstrations using experimental research with

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local farmers, teaming up with researchers, chemical and fertiliser industry representatives, management and extension education personnel should be utilised to develop field-based research plots. Model or demonstration programmes should be established to promote conservation education and which could have eventual changes in field practice.

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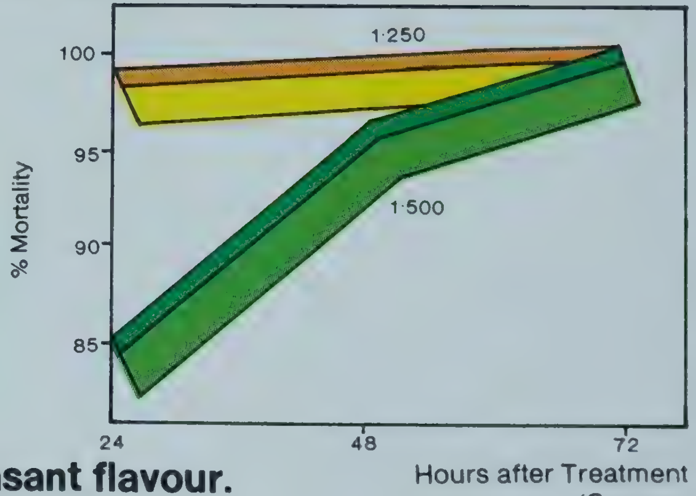

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SCOPE FOR BIOFERTILIZERS IN TEA CULTIVATION IN SOUTH INDIA

D.P. VERMA and B. CHANDRA MOULI*

Biofertilisers can be appropriately called "microbial inoculants". They are containing live or latent cells of efficient strains of nitrogen fixing, phosphate solubilising or cellulolytic microorganisms used for application to seed, soil or composting organic matter. They help in the multiplication of such microorganisms and accelerate certain microbial processes to augment the availability of nutrients in a form, which can be easily assimilated by plants. Powdered peat soil, lignite, charcoal or powdered farm yard manure are used as carriers for inoculants of biofertilisers. The powdered carrier is neutralised with calcium carbonate, autoclaved and mixed with a broth culture of the particular microorganism. The mixture is cured in trays for two to five days and then packeted in polythene bags. A slurry of the carrier based culture is made with minimum amount of water and the seeds are inoculated by mixing them with the slurry. The seeds are dried in shade and sown. For transplanted crops, the seedlings are dipped in the slurry for 10 to 30 minutes and immediately planted. In standing crops, the inoculant is mixed with farm yard manure or soil and broadcasted either in the root zone or incorporated in the surface soil.

The biofertilisers that are commonly available are :

1. Biological nitrogen fixers
2. Phosphate solubilisers
3. Organic matter decomposers.

1. BIOLOGICAL NITROGEN FIXATION

Biofertilisers harness atmospheric nitrogen with the help of specialised soil microorganisms including several species of bacteria (not all of which are associated with legumes), a few actinomycetes, blue green algae and cyanobacteria. Such nitrogen fixing microorganisms are either free living in soil or symbiotic with plants and directly or indirectly contribute towards the nitrogen nutrition of plants. The mechanisms is as follows :

$$N_2 + 6H^+ + 6\,e^- \xrightarrow[\text{}]{\overset{\boxed{\begin{array}{c}\text{Fe}\\ \hline \text{Fe, Mo}\end{array}}}{\text{(nitrogenase)}}} 2\,NH_3$$

$$NH_3 + \text{Organic acids} \longrightarrow \text{proteins}$$

The site of N_2 reduction is the enzyme nitrogenase, a tow-protein complex consisting of a larger iron- and molybdenum- containing member and a smaller companion containing iron.

Fixation systems :

1.1 Symbiotic systems, nodule forming
   a. with legumes
   b. with non-legumes

1.2. Symbiotic systems, non-nodule forming

1.3. Non-symbiotic systems

1.1. a. Symbiotic fixation with legumes

Bacteria of the genus *Rhizobium* in association with legumes provide the major biological source of fixed nitrogen in agricultural soils. These organisms invade the root hairs and cortical cells, ultimately inducing the formation of nodules, which serve as a home for the organisms. The host plant supplies the bacteria with carbohydrates for energy, and the bacteria reciprocate by providing the plant with fixed nitrogen compounds. This type of living together or 'symbiosis' is mutually beneficial.

There is considerable specificity between *Rhizobium* species and the host plants they invade. Thus, *Rhizobium trifolii* invades *Trifolium* species (mostly clovers), *Rhizobium phaseoli* invades *Phaseolus vulgaris* (beans), and so on.

Hence, *Rhozobium* species are of little use in tea as a biofertilisers. However, cultivation of legumes like *Mimosa invisa* (thornless *Mimosa*) as a cover crop in vacant patches and lightning pockets would be useful.

1.1. b. Symbiotic nitrogen fixation with nodule forming non-legumes

The soil actinomycetes of the genus *Frankia* fixes nitrogen in angiosperms in certain forest areas and wet lands. This organism invades the root hairs and form distinctive nodules. Certain blue-green algae are known to develop

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nitrogen fixing symbiotic relations with green plants. Algae of the genus *Nostoc* are involved and the rate of fixation is typically 10-20 kg of N per ha per year. These are also not useful in tea cultivation.

1.2. Symbiotic nitrogen fixation, non-nodule forming

Azolla/Anabaena complex flourishes well in rice fields in tropical and semi-tropical areas. *Anabaena*, a blue green algae inhabits the leaf cavities of the floating fern *Azolla* and fixes quantities of nitrogen comparable to *Rhizobia*/legume complexes. Here again, they have no scope in tea culture.

1.3. Nonsymbiotic nitrogen fixation

There exists in soil and water, certain free-living microorganisms that are able to fix nitrogen. In upland mineral soils, the major fixation is brought about by species of heterotrophic aerobic bacteria belonging to *Azotobacter* and *Beijerinckia*. Certain anaerobic bacteria of the genus *Clostridium* are also capable of fixing nitrogen.

1.3.1. *Azotobacter*

Azotobacter inoculants are popular as they can be applied to many non-leguminous crops for promoting seed germination and initial vigour of plants due to growth substances produced by these microorganisms. *Azotobacter* is not generally present on the rhizoplane (root surface) but is abundant in the rhizosphere (the soil immediately surrounding roots). Root exedates or excretions containing amino acids, sugars, vitamins and organic acids along with the decaying portions of root system serve as energy sources for *Azotobacter* multiplication.

Two factors exercise major influence on the population of *Azotobacter* in soil. They are the associative and antagonistic action of soil microflora and organic matter content of soil. Cellulolytic microorganisms which degrade plant residues in soil are known to encourage the proliferation of *Azotobacter* in soil. *Cephalosporium* spp. a common fungal soil inhabitant is known to inhibit the growth of *Azotobacter*, impeding nitrogen fixation.

The lack of organic matter is a limiting factor in the proliferation of *Azotobacter* in the soil. The nitrogenous fertilisers also inhibit the growth of *Azotobacter*, while phosphatic fertilisers improve the bacterial growth and proliferation. They are sensitive to soil pH and their activity diminishes below pH 6.0.

In the past, two formulations of *Azotobacter chroococcum*, namely, "Azoviggor" and "Natrin" were evaluated in tea. Azoviggor was mixed with suitable carriers such as soil and dolomite. Only marginal increase in crop was noticed following Azoviggor treatment and the yield recorded in different treatments was inconsistent.

In another experiment the effect of Azoviggor on VP tea plants in nursery was studied. There appeared to be no effect of Azoviggor on the growth of nursery plants. Similar inconsistent results were obtained with Natrin.

The survival and function of these formulations of *Azotobacter* under acid condition of tea soils and the husbandry practices followed in tea culture are believed to have caused this inconsistency. Efforts must be directed by the manufacturers of biofertilisers to develop a bacterial culture suitable for application in tea fields.

1.3.2. *Azospirillum*

Azospirillum is widespread in soils and occurs outside as well as inside the roots of plants in the tropics. In crops like finger millet, sorghum and barley, inoculation of *Azospirillum (A. brasilense)* was found to enhance yields. The effects of inoculation were more conspicuous in plots under low levels of added nitrogen. Field trials indicated a saving of 20 to 40 kg N/ha depending on the crop and location.

The nitrogenase activity by *Azospirillum* though maximum at pH 6.7 to 7.0 was also detected up to pH 5.7. Sandy soils devoid of organic matter were generally unfavourable for *Azospirillu*, whereas, soils rich in organic matter favoured its existence.

The acid tolerant strains of Azospirillum may be useful in our tea soils.

2. PHOSPHATE SOLUBILIZERS

Several soil bacteria, particularly those belonging to *Pseudomonas* (*P. striata*) *Bacillus* (*Bacillus polymyxa, B. circulans*) and certain fungi viz. *Aspergillus awamori* possess the ability to convert insoluble phosphates into soluble forms by secreting organic acids such as formic, acetic, propionic, lactic, glycolic, fumaric and succinic acids. These acids lower the pH and bring about the dissolution of insoluble phosphates either from soil or rock phosphate into soil solution which will be available to plants.

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In tea, two formulations of phosphate solubilizers namely Symbion-P and Thulir are currently being evaluated. Their efficacy is studied at normal and half the levels of recommended phosphate levels. The experiment was initiated in 1994 and is being continued.

3. ORGANIC MATTER DECOMPOSERS

Composting involves microbiological processes which occur naturally with the help of native cellulolytic microoorganisms in compost pits. The cellulolytic microoorganisms are *Trichoderma viride, Chaetomium abuanse, Myrothecium roridum, Aspergillus niger, A. terres, Cellulomonas* spp. and *Cytophaga* spp. Under anaerobic conditions, organic matter is decomposed by primary as well as secondary microorganisms. The primary colonisers initially convert the complex carbohydrates and proteins into simple carbon sources. The species of the genus *Clostridium* predominant in anaerobic surroundings degrade cellulose to organic acids (acetic, formic, lactic, succinic and butyric acids) and alcohols. Methane bacteria such as *Methanococcus, Methanosarcina, Methanobacillus* and *Methanobacterium,* which are secondary colonisers break down organic acids into methane and carbon-di-oxide.

BIOFERTILISERS IN TEA

Tea is a foliage crop, where the crop shoots are harvested at regular intervals. In this process, nutrients are removed from the plant-soil system, and they should be replenished to maintain the nutrient status in the soil. Among the essential nutrients the requirement of nitrogen is considerably high. During early forties, the importance of maintaining the organic matter status of soil by retaining prunings, litter and shade tree loppings was recognised in tea plantations. Since then, the UPASI Scientific Department has been advocating maintenance of medium to high organic matter levels in tea fields.

At present, manuring policy is based on integrated nutrient management; where the nitrogen (N) dose varies with the organic matter status of the soil and on the yield level. The N rate ranges from 4 to 12 kg N per 100 kg of made tea per ha. In view of the escalating input costs conjoint with the fall of prices of tea in recent years. It is vital to evolve a strategy of more judicious combinations of chemical fertilisers, organic manures and biofertilisers. The biofertilisers may supplement inorganic fertilisers in the coming years. The following points may be considered in this regard :

1. Specific strains of nitrogen fixers and phosphate solubilisers should be developed for tea by the manufacturers as tea soils are acidic in nature. Strains developed for other crops were not found suitable in our earlier experiments.
2. Critical evaluation of non-symbiotic nitrogen fixers is needed under different levels of added nitrogen in different agroclimatic zones and under varied soil conditions.
3. Function and performance of these organisms in high yielding tea fields should be critically looked into as the nitrogen levels vary from 200 to 350 kg N/ha/year.
4. Performance can be assessed only in long term field investigations extending over one or more pruning cycles.
5. Any conclusion based on short term field trials would be misleading.

LETTER TO THE EDITOR

ATTITUDINAL CHANGES . . .

Apropos your Editorial "Attitudinal changes called for among Planters and Scientists" in the August 1995 issue of *The Planters' Chronicle.* I hasten to state that the picture given about the relationship between the planter and scientist is not so depressing as it is made out to be. With my little experience in Tea, I would wish to state that there is good working relationship between the planter and the scientist. Maybe, we can improve upon the relationship as it exists today, but the scenario is not so bad as stated in your Editorial. I would beg to differ with the view that many planters have little or no clue of what the Scientists in TRI are doing and they hardly bother to find out about it. It may also not be correct to state that the Scientists in TRI lament at commercial people not appreciating or understanding the vital role of Research. The actual position may be somewhere in between these two scenarios. In my humble opinion, there is a good working relationship between the planter and the scientist which has gone a long way in helping out the industry in South India.

S.K. MISHRA
General Manager - Plantations

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SCOPE OF SOIL RESOURCE INVENTORY FOR PLANNING PERSPECTIVE LAND USE

D.P. VERMA* and A. ABDUL KAREEM**

With increasing human and animal pressure on land, agriculture and plantation gradually extended to marginal lands having areas with increasing stresses and less favourable environments resulting in exposure of soils to forces of degradation. Soil degradation refers to the decline in soil quality. It is defined as the rate of adverse change in soil quality and decline in productive capacity due to processes mainly induced by human intervention. This calls for urgent measures to bring a halt to different degradation processes and to restore the productivity of degraded lands.

The application of remote sensing technology is used in mapping soil and land resources of watersheds even at medium or larger scales with the improvements in spatial, spectral and radiometric resolutions of the remote sensors. The remote sensing information can be integrated with Geographic Information System (GIS) for identifying potential areas suitable for agricultural crops, plantation crops, agro-forestry and for pasture as per soil resources for their rational use.

The map of tea plantations of South India can be prepared by combining appropriately the soil maps of Tamil Nadu, Kerala and Karnataka and the detailed soil survey map at the appropriate scale (1 : 10,000 scame) may be prepared by field surveys and laboratory analysis for use by Tea Estates and small growers. After preparation of soil resource map of tea plantations, the plantations existing on high slopes prone to excessive soil degradation may be demarcated, as they are getting degraded with the passage of time especially when the bushes are pruned on every four or five years to maintain their vegetative growth as well as to adopt crop husbandry practices. This will help to adopt the proper soil conservation measure to prevent further degradation of soil resources for sustainable productivity of tea. The resource map of tea plantations will be helpful to explore the new areas suitable for tea plantation without disturbing the ecosystem for the enhancement of tea productivity as well as it will be helpful to adopt the appropriate modern crop husbandry practices to increase the productivity as per the soil resources for sustainable productivity of tea.

The major problem of tea soils of South India is the intense rain leading to severe erosion due to steep slopes coupled with rolling topography. The conservation strategy is contour planting with contour drainage in the soils with flat lands, contour bunds up to six per cent slope, graded bunds at six to ten per cent slope, graded trenches at ten to sixteen per cent slope and bench terracing at 15 to 33 per cent slope; this will reduce soil loss from 30 to 50 tonnes/ha/year to less than 0.5 tonnes/ha/year. Lands above 33 per cent slope should not be brought under new tea plantations, they should be alternatively used for silvi pasture (growing of trees along with dense grasses). If tea plantations are already exiting above 33 per cent slope, it is desirable to break the length of slope at every ten meters by establishing vegetative barriers of one metre width consisting of hardy grasses or local shurbs. Both biological and mechanical measures are to be employed in combination for conservation of valuable surface soil. In this context, the statements made by our late Prime Minister Smt. Indira Gandhi on the subject of earth and mankind is relevant, wherein she stated that "The earth has been ravaged, desecrated, made sterile, perhaps through ignorance in the initial stages but lately driven by greed and arrogance. Today it is not ignorant but the knowing who pose the main danger to human kind survival".

In conclusion, soil is our strength and more we know better the longer we live. We must use our soil resource rationally and conserve it, if we and our future generations are to survive.

In this context, the National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) has completed soil resource maps of all the States on 1 : 250,000 scale and of the country on 1 : 1 m scale, in co-operation with the State Departments of Agriculture and the Agricultural Universities to provide information on :

(a) Delination of potential and problem areas in order to work out strategies to optimise land use,

(b) Developing alternative options of land uses according to the capability of soils in order to maintain the soil health for sustainable agriculture,

(c) Rationalising the use of costly inputs based on soil type,

(d) Assessment and monitoring of fertility status of various polygons,

(e) Assessment of status on soil degradation and its monitoring for overall evaluation of soil health,

(f) Generating database for applications in different developmental activities,

(g) Evaluating land of alternative uses for rational land use planning.

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* **Head, Chemistry Division,**
** **Director, UPASI Tea Research Institute, Nirar Dam B.P.O., Valparai**

PAT: NEED FOR A.I. TAX REVIEW

Mr. P.S. Wallia, PAT Chairman delivering his address. Others : Messrs. P.S. Ponnapa, PAT Vice-Chairman, Prof. Raja J. Chelliah and C. Sankaranarayanan, PAT Secretary.

The Planters Association of Tamil Nadu has reiterated its demand that plantations should be taxed under the Income Tax Act with provision for distribution of part of tax collection among the States on the basis of origin and be totally removed from the purview of the States Agricultural Income Tax Act.

Presiding over the 42nd Annual Conference of the Association held in Coonoor on October 5, 1995. Mr. P.S. Wallia, Chairman, pointed out that since plantations had been recognised as Industry by Parliament by its special acts and *ipso facto* by the Constitution, this industry could no longer be dealt with as 'agriculture' for the purpose of taxation.

He called for structural reforms in taxation to ensure coordination between the Centre and the States in the matter of taxation. He said that the Agricultural Income Tax levied on the plantations by the States was the equivalent of "a presumptive tax and the whole exercise has degenerated into harassment of the assessees".

Mr. Wallia said that the fruits of economic reforms brought in by the Centre to increase production, productivity and international competitiveness had by-passed the plantation industry and tea plantations in particular.

He pointed out that while the country's industrial growth had touched a high of eight per cent and exports had risen to 30 per cent in dollar terms, tea production growth had been sluggish at one per cent in the last five years and exports had fallen to 149 m.kg. from 200 m.kg.

When viewed in the context of the statement made recently by the Minister of State for Commerce, Mr. P. Chidambaram that the country would have to be a net importer of tea if it did not achieve a minimum of 1000 m.kg. of tea by the turn of the century as the consumption was rising at a faster rate of over four to five per cent compared to the production increase of less than two per cent annum.

Mr. Wallia said that threat had to be taken seriously because import of tea to meet any domestic shortfall was a natural corollary to economic liberalisation and globalisation of trade. It would also spell doom to the tea industry, especially in the South.

Mr. Wallia, while endorsing the Statement of the Union Commerce Minister that the excessive State taxation leaving no money with the planters had been a hindrance to research and development and diversification of export markets in this sector, said that the tea industry in the State was hamstrung by irrational rules and regulations in regard to development and unrealistic taxation.

If the economic reform policies were to make their intended impact and achieve their goals, the Centre and the States had to follow well coordinated policies that were mutually supportive and complementary.

He alleged that the States had not dismantled their regulatory laws or rationalised their tax structure as perhaps their understanding of liberalisation had stopped with offering incentives and guarantees for attracting foreign multinationals to invest in new industries.

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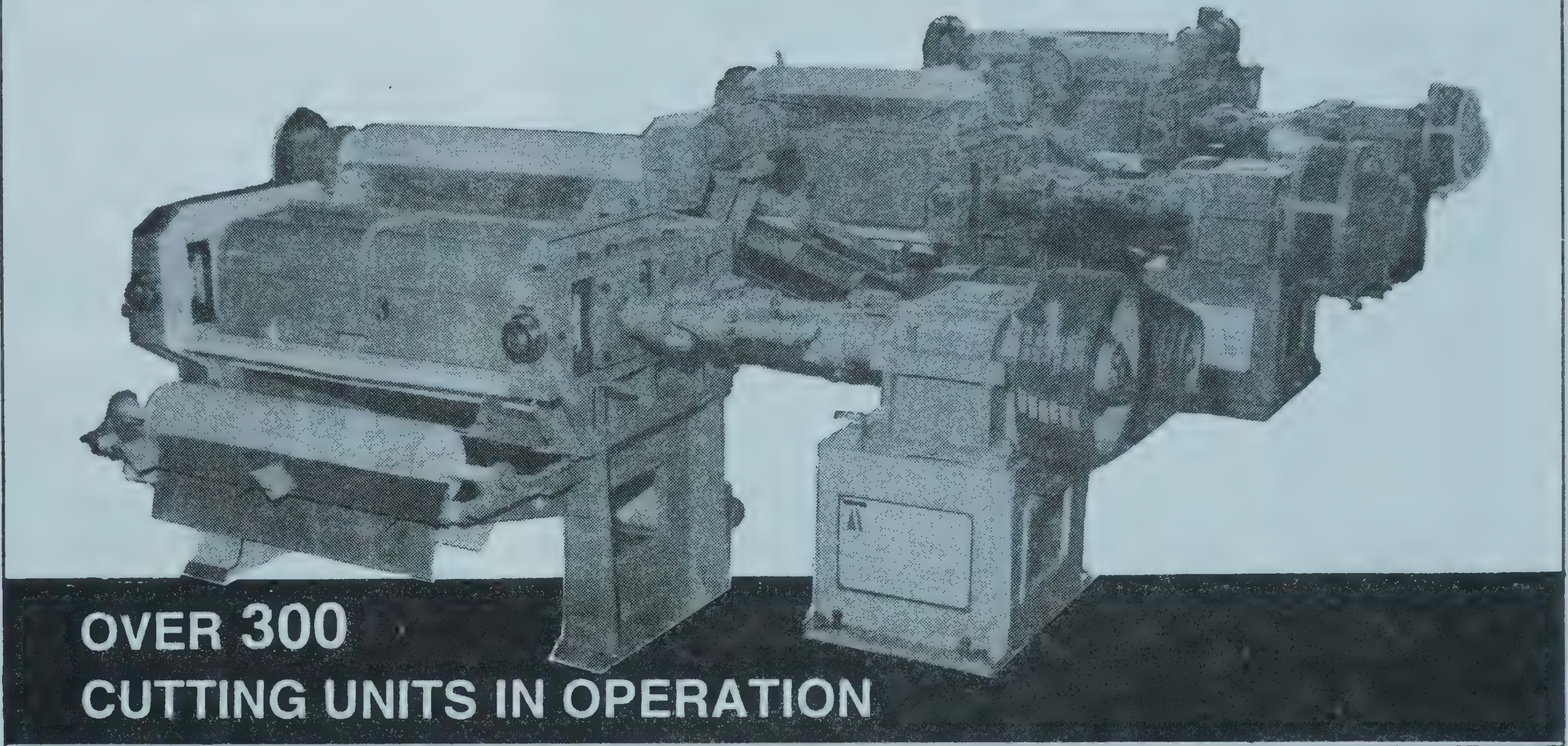

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Mr. Wallia lamented that the industry had the misfortune of being subject to uncoordinated control by the Centre and the State Governments.

The PAT Chairman said that land which was the main asset for the plantation industry was controlled entirely by the States which also mopped up the resources with the plantation through high State taxes.

Under the Land Reforms Act, he said, surplus lands held for future expansion had been acquired by the States reducing the scope for area expansion.

In Tamil Nadu, although some land had been earmarked and reserved for expansion, in the name of protection of forests, prohibition had been placed on new cultivation. If the targets fixed by the Centre were to fructify, it should persuade the State Governments to relax all the regulatory controls on all lands.

Alternatively, plantations including all their land and assets should be brought under the control of a single agency, the Central Government.

Referring to the high rates of Agricultural Income Tax, Mr. Wallia said that it was a paradox that in the country, with an agriculture-based economy, income from one segment of agriculture, namely, plantations should be taxed at rates even higher than those on industry and business.

Pleading with the Government to shed its misconceptions about the plantation industry as a legacy of the British that led to the imposition of crippling taxation at as high a rate of 83 per cent, the PAT Chairman said, "this mindset and tax regiment have unfortunately not changed even though the industry is now wholly Indian".

It is high time, he said, that the taxation policies of the States are shaped in harmony with those of the Centre. He regretted that despite repeated representations, the State Government had not been convinced on the need for a reduction and rationalisation of its tax structure.

The Association offered a blueprint for simplifying and rationalising the Agricultural Incom Tax in the

CALL FOR FURTHER LIBERALISATION OF FINANCIAL SECTOR

The Chairman of the Tax Reforms Committee, Prof. Raja J Chelliah, said further reforms in the financial sector and public sector units were necessary if the success of the current economic reforms had to continue, while more investments were needed for infrastructure development.

Inaugurating the 42nd Annual Conference of the Planters' Association of Tamil Nadu (PAT), Prof. Chelliah, a former member of the planning and finance commissions, said the current reforms were 'two steps forward' and though the country had achieved growth due to the reforms, it did not mean that they could be continued without further follow-up.

India's economic policy had been initially formulated with the misunderstanding of fulfilling the objectives of fast growth, self-reliance and reduction of poverty through State control and ownership but except for modernisation of agriculture and building-up of diversified industrial structure nothing had been achieved, he said.

Prof. Chelliah said though India succeeded in achieving self-sufficiency, it failed in becoming self-reliant and reducing poverty. This was due to the basic mistake of believing that self-sufficiency would lead to self-reliance and that State managed control and ownership would be better than individuals, he said.

Inward-looking economic strategy had led to stagnation and the launching of the economic reforms was necessitated for faster growth and increasing imports. There could be no faster growth without imports and competition was necessary for free play of market forces, he said and added that only if exports and imports increased, economy could be managed without external borrowings.

Quoting statistics, he said while in the beginning of 1980s export earnings met 50 per cent of the imports, in the later half nearly 70 per cent of exports made up for the imports while now 80 per cent of exports make up the foreign exchange necessary for imports. The rest was managed through remittances, particularly current account deposits, which made up 1.5 per cent of the GDP, he said.

Prof: Chelliah said if the reforms had to continue in the same vein, then privatisation of the banking and insurance sector was a must. The financial sector not being privatised due to political reasons and since none opposed privatisation except trade unions, it was likely to be initiated soon after elections to the Lok Sabha.

Reforms in the public sector units (PSU) could be brought about by either selling or closing the loss-making units since the government could not accept the responsibility for the losses. The government's business was to govern and maintain macro-level economy and not to run these loss-making units, he said.

On the other hand, the profit making PSUs should be made autonomous and the policy of disinvestment in these units should continue, he said and added that the private sector should be encouraged to invest more in new industries, he said.

- THE INDIAN EXPRESS

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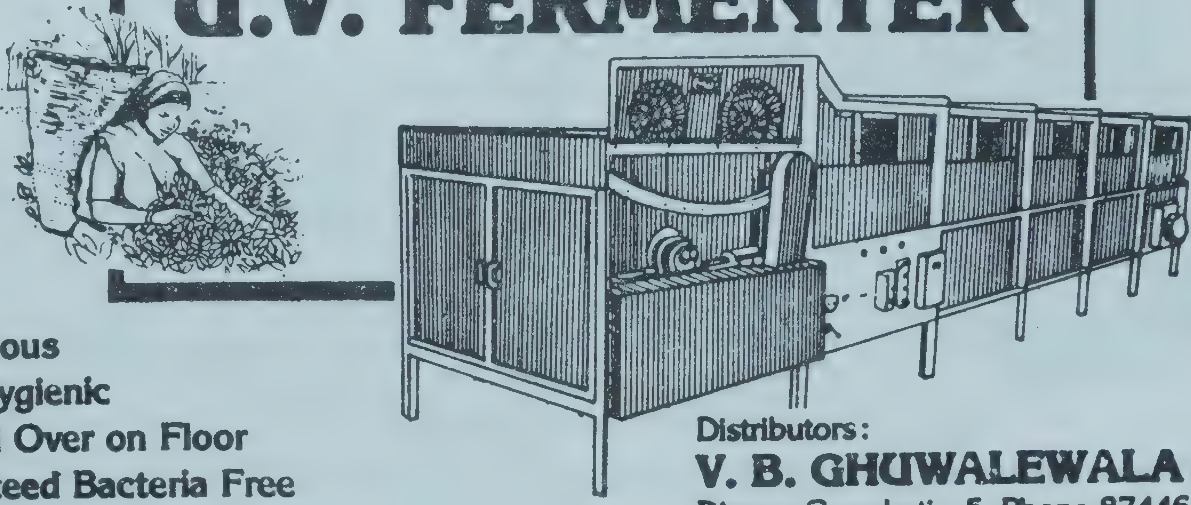

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event of the State Government considering that it was not politically feasible to have only a centrally administered tax system.

It suggested that the principle implied in th Income Tax Act that income means profits and gains must be adopted under the Agricultural Income Tax Acts also, that the planted assets in the plantations should be deemed to be 'plant' as defined in the Income Tax Act and allowed statutory depreciation, that all deductions and incentives allowed under the IT Act should be automatically deductible under the AIT Act and that the rates of agricultural income tax should not exceed the rates under the Central Income Tax. "On identical levels of income an agricultural income earner and a business income earner are on similar economic circumstances and it will be meeting out an unfair and unequal treatment to two different individuals similarly placed if their identical incomes bear different rates of tax", it was pointed out.

Mr. Wallia also argued that since tax was levied on income, whether agricultural or industrial it defied economic rationale to tax one and exempt the other and pointed out that total exemption given to agriculture apart from being discriminatory militated against the concept of horizontal equity. Taxing the farm sector will also widen the tax base and reduce tax avoidance to a great degree.

The PAT Chairman wanted the Centre to seek the cooperation of the Plantation States for an indepth review of the Agricultural Income Tax by a high level committee to bring about the much needed reform in the wake of economic liberalisation in the central sphere.

- THE HINDU

P.G. PRAKASH SHANKER

APK : Changing Circumstances

Tea, a traditional foreign exchange earner, is now lagging behind beyond anybody's imagination. It would not be out of place for me to also make a quick comparison of the increase in labour wage with that of price during the past say 10 year period from 1985. While the average daily wage of 1985 was Rs. 15.63, the average auction price of tea per kg. was Rs. 22.74. By 1994, the wage increased by 135 per cent, but the price by only 51 per cent. Exploration of new markets, value addition quality improvement, domestic promotion and improving the labour productivity norms are some of the measures to be adopted to ensure the growth of tea plantation industry in Kerala.

COFFEE :

After several years of stagnation, consequent to the fall in production in Brazil and Columbia, Coffee prices registered improvement from May 1994. The price reached its peak during September 1994 and has fallen steadily since then. However, the retail price continues to be high.

Responding to the demand of the industry, based on a detailed study done under the aegies of UPASI, the Government of India amended the Coffee Act during March 1994 to provide for the introduction and implementation of Free Sale Quota (FSQ), which was fixed at 50 per cent, with a provision for its increase. The industry had since then demanded introduction of cent per cent FSQ which has been announced from April 1995 in respect of small growers of 10 ha. and below. For others, the FSQ has been raised to 70 per cent.

NATURAL RUBBER :

During the year 1994-95 the country produced 4.72 lakh tonnes of Natural Rubber. the consumption was 4.83 lakh tonnes, the deficit being only 11000 tonnes. However, following internal price, rubber prices were ruling relatively high during the year. Consumers had been protesting against the high price and non-availability of natural rubber. Eventhough the projected net deficit for the current year is only 19,000 tonnes, the Government of India has allowed duty free import of 38000 tonnes, to be brought in before 31st August 1995. As a result, during the peak production period the month-end stock would be much more than even two months' requirement. It is feared that such stocks would lead to a fall in price of rubber.

Further to this, the Government of India has, during January this year, included natural rubber in the list of items eligible to be imported against Special Import Licence. While such imports attract duty and a premium is to be paid to acquire the licence, the facility could be utilised to depress the price of NR when the international price is relatively low. I feel that the Government of Kerala, which has come to the rescue of the 8 lakh odd rubber

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rowers during the past, should take ote of the hidden danger in the olicy and do the needful for its epeal. We have, from our side rought the matter to the notice f the Members of Parliament epresenting Kerala.

CARDAMOM :

Cardamom which is essentially a small holder plantation crop made a dramatic revival after the drought of 1992/93 season. The production of Kerala which rose to 4400 tonnes uring the 1993-94 season, further ncreased to 4500 tonnes during last ear. However, the inconsistency n production during the past few ears has adversely affected the xport prospects. As a result the average auction price which was Rs. 343.48 per kg. during 1993-94 came down to Rs. 259.63 per kg during the following year. The auction price reported during the current year is much lower. The ield also continues to be at elatively low level of around 100 Kgs. per ha. as against the 250 of Guatemala. This low price – low ield situation is to be viewed in he context of the rising cost of production. Uncertainity of the land enure in Kerala, apart from various other reasons, has also been a deterrent in undertaking long erm developmental activities for cardamom.

INDUSTRIAL RELATIONS :

We were indeed happy and proud of the very cordial industrial relations that prevailed during the year 1993-94. However, the year under review was a turbulent one for some of our member estates. When the bonus percentage declared, as per provisions of the Payment of Bonus Act, didn't match with their expectations, workmen resorted to agitational approach paralysing the very functioning. The resultant production loss, particularly of rubber, when price was ruling high and yield was at its peak has very adversely affected such estates. It is a well known fact that the months of December and January together account for almost 25 per cent of the annual production of natural rubber. Management can ill afford to loose such a production, which in turn will also adversely affect the bonus percentage of the succeeding year, in this case 1994-95, to be disbursed during this November.

In view of the rapid changes which are taking place, the plantation crops of the State in their raw form as well as in the value added form have to be internationally price competitive, in order to capture export markets. In Kerala, there is a steady rise in the Consumer Price Index and consequent increase in D.A. As a matter of fact during the last 3-year period the increase in D.A. was as much as Rs. 8.25 per head per day. This is in addition to the increase in wages at the time of wage settlement. The industry has no say on the increase in consumer price index. Therefore I would like to emphasise that in order to be price competitive, the overall increase in wage has to be neutralised by improved productivity, which is consistent with the declared policy of the Government.

IRRIGATION :

The purpose of the Kerala Irrigation and Control & Regulation of Ground Water Bill, 1994, according to the Government, is to consolidate and amend the existing laws on the subject. However, some of the proposals go beyond this and are detrimental to the very functioning of plantations. One such is the proposal to empower the Panchayat to have the right to use water courses within their respective local areas. As a matter of fact almost all the plantations are located within the local areas of one Panchayat or the other. One need not elaborate on the consequences of a Panchayat assuming the responsibility to irrigate the crops in a plantation.

The Union Commerce Minister has demanded that, by the turn of the century, tea production should be increased to 1000 m.kgs. In order to maintain a 9 per cent share the production of Kerala has to be raised to 90 m.kgs from the present level of 65 m.kg. For this yield has to go up to 2570 kg/ha from the present 1900 kg/ha. Irrigation would become a major player in the game for which plantations have to be self reliant.

AGRI. INCOME TAX :

The rates of tax levied are the highest and the allowable deductions are the lowest. Thus the effective rate of taxation could be as high as 80 per cent, the Income Tax rates being little over half of that. As a matter of fact the revenue from the Agricultural Income Tax is only of the order of 1 per cent of the total taxes collected by the State. Reduction in the rate of taxation would facilitate better plough back for the development of the industry, which in turn would ensure additional revenue to the State.

— Excerpts from the Chairman's speech at the 56th AGM of the Association of Planters of Kerala held on 30th September 1995.

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D.C. BOPANNA

APA : Local Issues

With the present day high cost of inputs and labour wages and the poor realisation for the produces, the very survival of the industry is at stake and in order to overcome the odds and to keep the Industry afloat, it has to look into ways and means to optimise production without compromising on quality.

In the labour front, the industry and the Association have faced several grave challenges from all quarters. – Mention must be made here to the Karamalai Group Estates strike where the unreasonable demand of higher Bonus by the Unions was not conceded to by the Management. – Consequent on the Go-slow and strike by the workmen, the Management declared a lock-out for 14 days. – The matter was settled before the Commissioner of Labour by agreeing to the matter to be referred for adjudication and the payment of recoverable/adjustable advance.

Your Chairman and Committee have convened a meeting with the leaders of principal trade unions operating in the Anamallais and discussed some important points with regard to the Check Off System.

The very nature of restrictive and punitive provisions of the Tamil Nadu Hill Areas Preservation of Trees Act, 1955 and the Tamil Nadu Preservation of Private Forests Act, 1949 stand in the way of fuller development of the industry. Under the Land Reforms Act some of the plantations which had uncultivated lands were allowed to retain an extend upto 20 per cent of their planted areas for future expansion. – Part of that area still remains unplanted because of the refusal to grant permission for clear felling under the provisions of the Private Forests Act and the Forest Conservation Act.

Cultivation of tea in the interspersed area within planted fields had received some set back. – Some of the plantations have succeeded in taking back excessive lands held by plantation workers for kitchen garden cultivation. These lands carry only plantain, vegetable, etc. without any tree cover. – Even cultivation of tea in such areas is being prevented and prosecutions have been launched against some of the plantations, on charges of violation of the Wild Life (Protection) Act.

IRRIGATION :

In increasing yields and production, irrigation has become an important input. – Almost from the inception of the industry there was no restriction on plantations using water flowing through or emanating from within the plantations for domestic use and for irrigation purposes. – Only Rs. 3/- to Rs. 15/- per acre was charged in respect of water used for sprinkler irrigation. In recent periods considerable restrictions have been placed by the Government authorities against drawal of water for irrigation purposes. – Now very high rates of water charges are demanded on the ground that plantations are deemed to be commercial enterprises, ignoring their agricultural character.

— Excerpts from the Chairman's speech at the 90th AGM of the Anamallai Planters' Association held in Valparai on 23rd September 1995.

P.S. GOPINATHAN

MPA : Rubber Outlook

Production of Natural Rubber during 1994-95 increased to 4,71,815 tons from 4,35,160 tons of the previous year, recording an increase of 8.42 per cent and this is the 13th year in succession that the output recording an increasing trend. The production of Synthetic Rubber was 60,500 tons in 1994-95. The domestic consumption of Natural Rubber in the corresponding year was 4,83,000 tons recording an increase of 7.2 per cent over the previous year. Though there was a decrease in the Import of Natural Rubber in 1994-95 to the tune of about11,000 tons, there was a corresponding increase of the same

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quantity in the import of synthetic rubber.

The price of rubber had recorded a satisfactory increase to over Rs. 50/- per kg. by March, 1995 and touched to about Rs. 65/- per kg. by Mid June. We hope that the import permit granted by the Central Government against the Special Import License will not pose any danger to the planters as the Association of Planters of Kerala had taken up the issue to the notice of the Members of Parliament from Kerala. The permission given by the Government of India to the manufacturers to import natural rubber before the peak season for a quantity of 37,000 tons is likely to result about two months' stockpile from October and the same is likely to depress the rubber price during the peak production period now onwards.

It causes anxiety to the planters that the above quantity sanctioned for import is almost the double of what Rubber Board had made assessment as deficit for the period immediately preceding the peak season.

The wage settlement for the plantation labour expired on the 31st March, 1995. The Core Group constituted by the Association of Planters of Kerala on Rubber had detailed discussion for the strategy to be adopted during the discussion on the issue at PLC. Our presentation of the issue to the labour represent at the PLC, we trust, will make improvement in the productivity norms from the labour.

This Association had the opportunity to discuss the issues affecting the plantations with our sister association the Central Travancore Planters' Association as initiated by the Association of Planters of Kerala on the 10th Report of the Subordinate Legislation Committee and such interaction on common issues among the District Planters' Association will always benefit the planting community. The issue now has been referred to the PLC by the State Government.

Eviction of retired workmen from the plantations had been creating some problems for the members and pursuent to the representation made by the APK, the Government of Kerala had notified the Chief Inspector of Plantations as the competent authority to issue notice to the workmen refusing vacation and report to R.D.O. of the jurisdiction for implementation.

The activities of UPASI R & D Centre, Kottayam, had been very helpful for the plantation, particularly on Rubber wood promotion, Rubber based sustainable farming projects, intercropping of medicinal herbs in Rubber, Organic Farming etc.

With the limited availability of helicopters, the coverage for aerial spraying is found undependable and in last season most of the mature area also have to be covered by ground spray. Alternate method of spraying, had to be taken up. Now it is suggested to utilise Mechanised Glider and the Rubber Board should try this as experimental basis.

— Excerpts from the Chairman's address at the 90th AGM of the Mundakayam Planters' Association held on 30th September 1995.

Mr. P.H. PINTO

Mr. P.H. Pinto, Deputy General Secretary, ESUSI, Karnataka, died on 1st October 1995 at his residence in Chikmagalur. He was a veteran trade union leader and served the ESUSI for more than four decades from 1954. He was 66.

Mr. B.K. MUTHANNA

Mr. B.K. Muthanna, formerly of Prospect Estate, Nilgiris, died on 18th September 1995 in Ootacamund Club, Ooty. He was 69.

N.C. KANKANI

TTAC : Changing Market Scenario

The rapid change in Tea Market Scenario should be a cause for worry for the auction centres of the country. Total auction offerings of the tea through auction centres in North India as well as South India have come down from 84 per cent to 64 per cent during the last 10 years. This decline can be attributed mainly to consumer switchover and preference from loose tea to packet and pouch teas. Apart from it being consumer friendly and most of the brands being garden packed fresh teas, the packet/pouch tea ensures no adultration at any stage so much so that about more than 200 brands of packet and pouch tea are reported now in the market in India.

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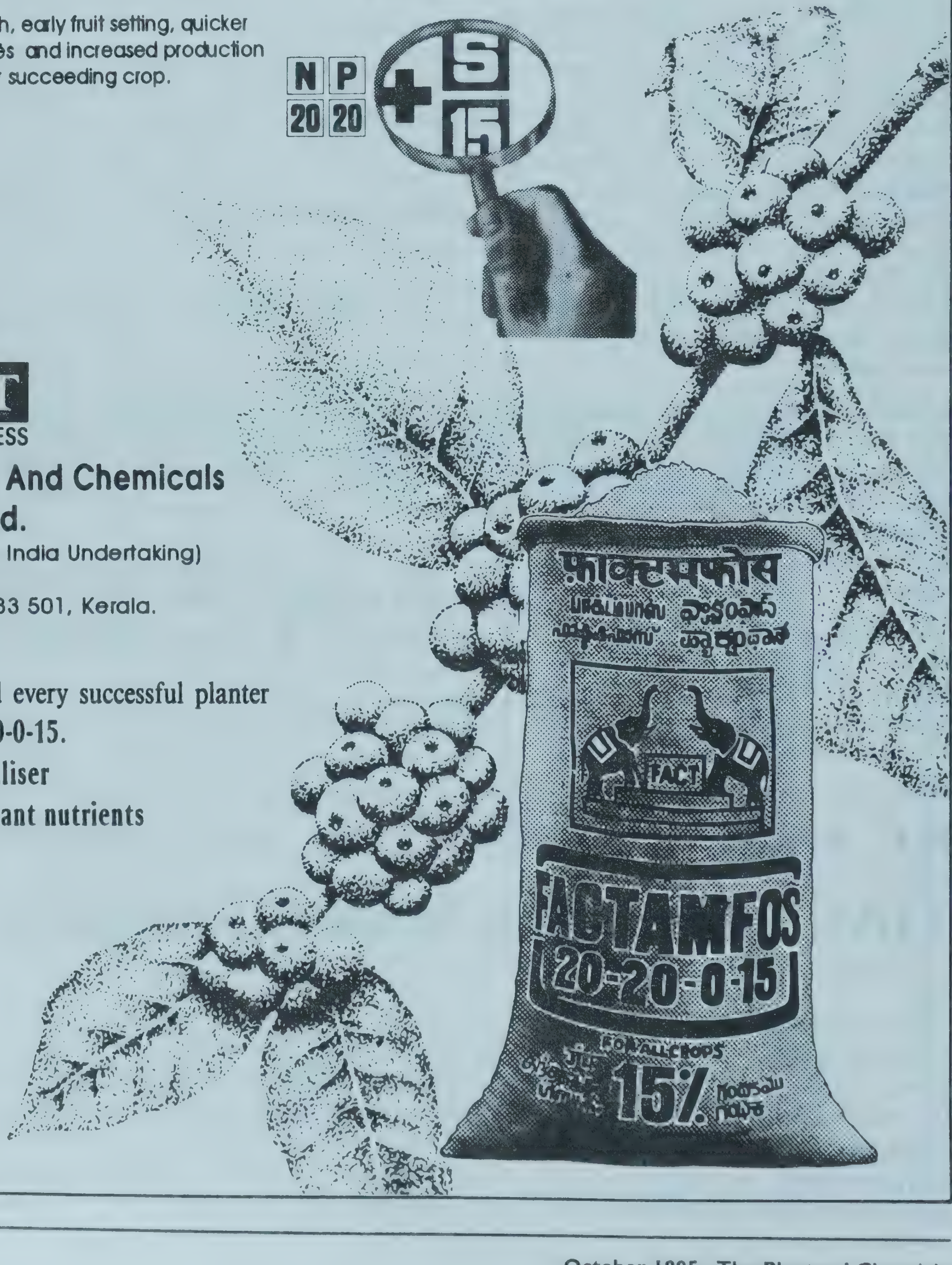

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Out of some 600 m.kg. of tea consumed in our domestic market, 1/3rd is accounted in urban areas and about 2/3rd in rural areas. Again 1/3rd of total internal consumption i.e. about 200 m.kg. is sold in packet/pouch form. 1/3rd whereof goes into rural areas. Talking about the popularity of packet tea, it is reported growing at an average of 6 per cent every year. This trend is only likely to get momentum year after year in our country which should, of course, be considered as a reflection of steadily improving standard of living of the masses and especially in the rural areas. Direct exports by producers, taking advantage of Income Tax relief could perhaps be another major cause for this trend.

FALL IN PRICES

Unfortunately, the largest fall in average annual prices was recorded at Coonoor by Rs. 12.93 followed by Coimbatore at Rs. 12.50 and Cochin by Rs. 9.52, making an average Rs. 11.31 per kg. drop from South auction centres as against which North auction centres lost only by Rs. 7.17 making an All India drop in sale average for auction tea by about Rs. 8.32. This unusual drop in auction prices from South Indian centres should be considered rather alarming and out of context when we draw any inference from export of total tea from North as well as South.

Though the total exports on All India level dropped from 180 m.kgs. in 1993 to 149 m.kg. in 1994, a drop of 31 m.kgs. from the country as a whole, it may be pertinent to bring home the fact that this entire drop plus something more is accounted only by North India where the exports came down from 134 m.kg. to 89 m.kg. last year whereas the exports from South India have gone up from 46 m.kg to 60 m.kg. an increase of 14 m.kg., percentage-wise it comes to an increase of 30 per cent. The oft reported drop in exports from India to CIS countries is entirely from North-East where exports of 47 m.kg. dropped down to a mere 11 m.kg., a drop of 36 m.kg. whereas exports from South India where production remained almost the same during 1993 as well as 1994 have invariably seen a clear increase for all tea importing countries, including to CIS countries but most of these buyers were price conscious. Here again it may be relevant to note that most of our tea exports go to such of the countries whose economy is not on a very sound footing. Some of these countries have constant payment problems imparting a violent setback to our exports. Even after a great debacle on our exports to one single country, the erstwhile Russia now the Republics of CIS, we are willynilly drifting once again to one single basket which speaks volumes of our helplessness in diversifying and broadbasing the destinations for our teas.

HIGHER EXPORTS

Exports during the first seven months of this year are higher by 9.4 m.kg. Thanks to the efforts of the Tea Board and Ministry of Commerce that there is a clearcut revival of demand from CIS countries and Polland in particular and tea prices have been showing relief and improvements specially during the last 2 to 3 months. It is reflected in all auction centres of the country and there is every hope that this revival in export demand shall be maintained all through the year.

There is one area where Tea Board can play a very vital role in stabilising the prices i.e., avoiding sharp and violent fluctuations which not only hit the consumer conspicuously but also embarrasses the seller in either selling below COP or making a large margin for a short period.

REPERCUSSIONS

At present, export figure is deducted from total production and the balance is retention figure. In all parlours and for all intent and purposes, retention is taken as internal consumption ignoring the increase or decrease of stocks in the pipeline. In the process, there is no true assessment, not even an approximate one, about incremental increase in domestic consumption. The pipeline stocks at times are sufficient for only one month and sometimes for three months or more. It is only when the market forces of demand and supply create a sudden impact and catch the sellers and buyers unawares that violent fluctuation take place in tea prices. If Rs. 10/- per kg. increase or decrease is spread over about 6 or 10 months, it does not pinch any but if it comes in weeks, it creates unpleasant repercussions. To overcome this dilemma, I suggest that Tea Board asks all the six auction centres in the country to collect warehouse stocks of their jurisdiction and feed the information to Tea Board by 7th of every month. Tea Board can also direct major tea packeters and exporters to send similar figures excluding their stocks at warehouses already covered by auction centres. All tea producers send its month-end stock figures to Excise Department. Tea Board can either collect it, from them or ask gardens, through major producer associations (as they do for their production figures) to consolidate the factory stock figures every month.

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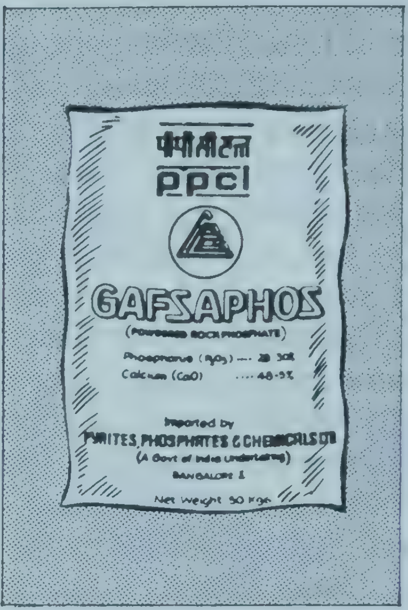
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Meetings

house-stuffing of containers with effect from 1st October 1995. We would request The Chief Regional Executive, Tea Board to take up this matter with the government and restore the facility which shall help the tea industry in boosting the tea exports.

Our experience shows that as and when domestic prices rise beyond a point, Indian tea becomes uncompetitive with Sri Lankan and Kenyan teas, target tea market being the same but the very recent depreciation of the rupee in favour of dollar may cancel this imbalance to a very great extent in favour of tea exports of our country and it is hoped that tea exports may touch 160 m.kg., if not more as against 149 of last year. This extra export during 1995 coupled with the lower production of tea in the country may help the sellers and buyers to clear the backlog and carryover of previous season teas in toto. Reduced production shall no doubt reduce the overall profits but this may help to wipe out some of the heavy losses that tea producers particularly in South have incurred during 1994 when they were obliged to sell most of the tea during most part of the year at below their cost of production. This is only a very short-term picture.

LONG-TERM OUTLOOK

The long term outlook projected by the FAO for the year 2005 estimates global production at 2833 m.kg against 1909 m.kgs. during 1991-1993 — an increase of 924 m.kg. whereas FAO's world consumption projection is estimated at only 2766 m.kg., leading to a surplus of 67 m.g. by that year. This should serve as a red signal to the tea producers to gear-up their technology to improve the tea quality to remain competitive in the global market.

— **Excerpts from the Chairman's address at the 13th AGM of the Tea Trade Association of Coimbatore held on 28th September, 1995.**

PERSONALIA

PAT OFFICE BEARERS

Mr. P.S. Wallia has been re-elected Chairman of the Planters' Association of Tamil Nadu (PAT) for the year 1995-96.

Mr. P.S. Ponnapa was re-elected Vice-Chairman. The other members of the Executive Committee are : Messrs. N. Dharmaraj, D. Hegde, C.K. Jayaram, C.D. Kabra, S.C. Kankani, B.B. Medaiah, S. Ramachandran, K.N.V. Ramani, T. Rangaiah, M.S.P. Rajes, M. Saleem Sheriff, E.B. Sethna, P. Singh, M.K. Subramaniam, S. Suryanarayanan, M. Thangavelu, R.D. Vadera, M.M. Venkatachalam and A. Venugopal.

APK OFFICE BEARERS

Mr. P.K. Madhava Menon has been elected Chairman of the Association of Planters of Kerala for the year 1995-96.

Mr. K.A. Kuttaiah was elected Vice-Chairman. The other members of the Executive Committee are : Fr. Devassy Earathara, Messrs. George John, A. Jacob, A.T. Jacob, S. Jacob Thomas, E.K. Joseph, P.G. Prakash Shanker, S. Ramakrishna Sarma, G. Sethuram, Sudhir Prakash, J.K. Thomas and E.B. Unni.

APA OFFICE BEARERS

Mr. N. Dharmaraj has been elected Chairman of the Anamallai Planters' Association (APA) for 1995-96.

Mr. J. Alexander Arputhasamy was elected Honorary Secretary. The other members of the committee are : Messrs. K.S. Somiah, D.P. Maheswari, M.K. Sanyal, N.J. Wood, C.D. Ganapathi, D.C. Bopanna, K.S. Mandanna and P.M. Chengappa.

TTAC OFFICE BEARERS

Mr. U.V. Saraf has been elected Chairman of the Tea Trade Association of Coimbatore (TTAC) for the year 1995-96.

Mr. B.B. Medaiah was elected vice-Chairman. The other members of the Committee are : Messrs. N.C. Kankani, O.R.M. Prabhu, B.R. Bhansali, C.B. Abyshekar, N. Sriram, I.C. Warne, C. John Kurian, A.I. Kurian, Hemant J. Shah, Philip John, K. Jayakumar, Suresh Baboo, G. Mohan Chand and Amal Roy Choudhury.

MPA CHAIRMAN

Mr. P.S. Gopinathan has been re-elected Chairman of the Mundakayam Planters' Association (MPA) for the year 1995-96. Mr. N.K.A. Nambiar is Honorary Secretary.

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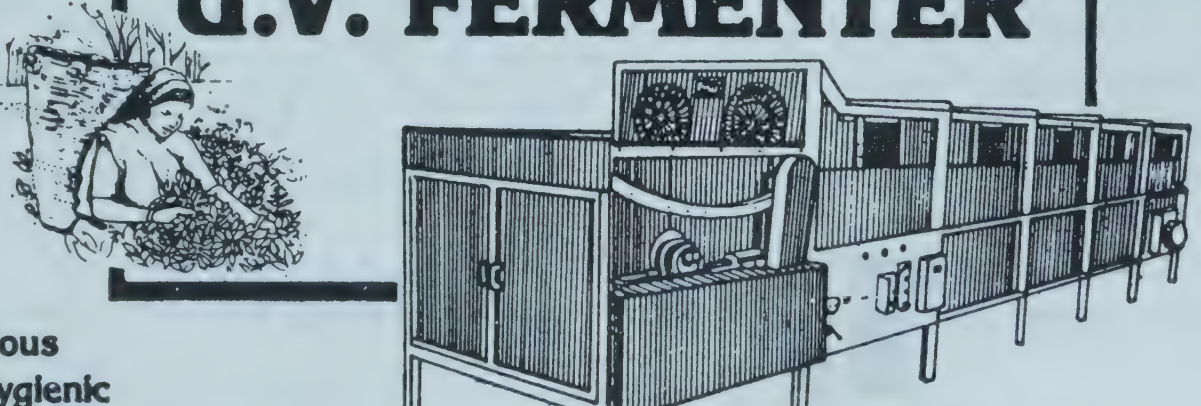

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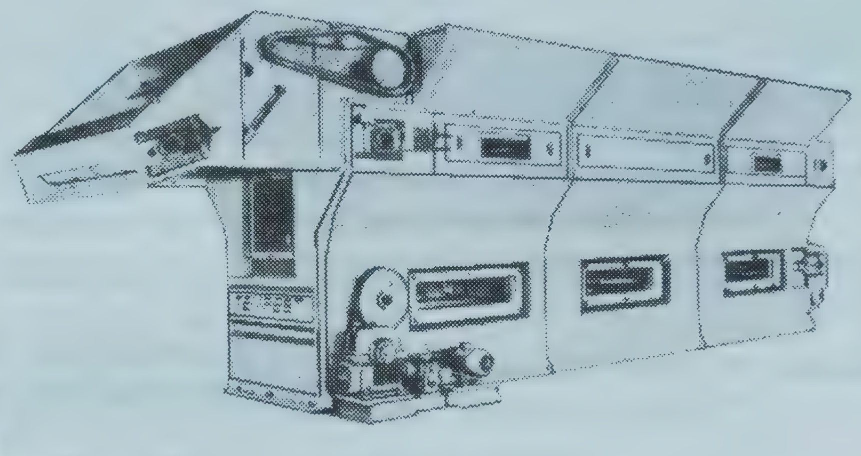

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ECO-FRIENDLY PLANTATIONS VIS-A-VIS NEED TO ACCELERATE TEA PRODUCTION

The target set by the Government is for tea production to reach 1000 m.kg by 2000 A.D. as against 1994 production of 748 m.kg. Going by the ratio and tea production of South and North, South production should go up from 184 m.kg in 1994 to 235 m.kg by 2000 A.D., which means an average annual compound growth of 4.2 per cent.

At a meeting of UPASI, TRI, Advisory Officers and KVK convened to discuss the matter, it was evident that it would be possible to achieve the production target possibly by the year 2002 if not by 2000 itself, provided :

- more planters take up to improved methods of cultivation in all its gamut
- the present levels of loans and subsidies fixed by Government for various tea development schemes are enhanced.

One interesting point that came up at the meeting was the vide variation in yield and agriculture practice between enlightened planters who put in all efforts to increase production and those who do not show any interest at all. The production target envisaged is unlikely to be achieved if the latter segment evinces no interest in increasing production.

UPASI-KVK had organised a Workshop on Eco-friendly Cultivation of Tea. Scientists from TRI and others gave illuminating talks on the attitudinal changes required among planters for plantation development becoming eco-friendly.

To a certain extent there is conflict between the above two objectives. If one is to give the emphasis only for rapid production growth, then to a large extent compromises have to be made on eco-friendly aspect i.e., use of fertilisers, pesticides, etc.

Ecology aspects can no longer be considered as a fad or something which only others should practise. It involves everyone. Apart from the positive aspect of the matter, there is also the practical aspect. Recently, Germans raised hue and cry about the use of pesticides in tea and employment of children in the tea plantations. The green movement in developed countries is a force to reckon with. They will not confine to looking at the imported product on the ingredients of the product to determine whether they are harmful or not, but they go further in finding out whether, in the manufacturing of the products, the environment is too much affected. If the latter is the case, then they do not allow import. There was the recent case of leather manufacture. When the importers noticed that the manufacturing process was adverse to environment, there was stoppage of imports.

The point that is made is that eco-friendly activity cannot any more be taken lightly. At the same time, rapid production growth is also a necessity. How to compromise. Hasten slowly?

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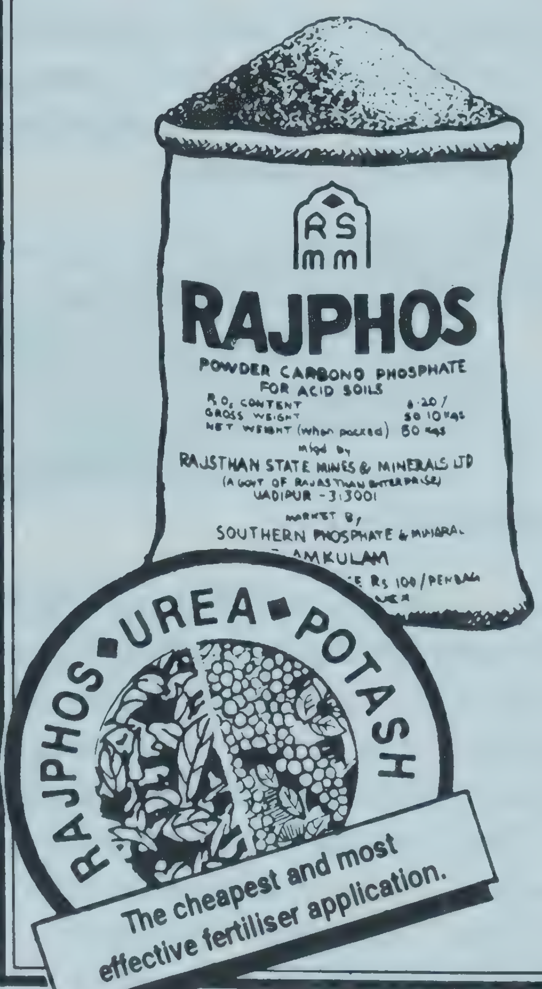
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PLANTERS' ROLE IN THE CHANGED SCENARIO*

by

K.P. UTHAPPA

On an occasion like this, it is our duty to remember and pay homage to the memory of some of the great personalities, both in the industrial as well as in the planting fields, to draw inspiration from their lives and works to make our lives useful and sublime. Here, I quote a passage from Rudyard Kipling, which is enshrined in the Committee Room of the UPASI :

"Let us now remember and praise
famous men, famous planters -
Men of little showing but,
of great vision & wisdom;
For their work continueth;
And their work continueth;
Broad and Deep continueth;
Greater than their knowing."

The two great personalities whom we should remember today are the late Mr. J.R.D. Tata, the Doyen of the Indian Industries and the late Mr. Ivor Bull, the Doyen of the Indian Coffee Industry, both of whom have left their footprints deep and clear, one in the industrial field of India and the other in the Plantation Districts of Karnataka. Both of them, in their lives, had followed the message contained in the words of the Tata Crest – 'HUMATA', 'HUKHTA' and 'HVARSHTA' in the ancient Avesta language, which means – 'GOOD THOUGHTS', 'GOOD WORDS' & 'GOOD DEEDS' and had practised what Swami Vivekananda had said – "Every work is holy and, devotion to duty is the highest form of worship.'

The Malnad Districts of Karnataka viz., Chikmagalur, Hassan and Kodagu are the prettiest districts of this State. The plantation areas are in these districts, which provide employment, directly to over 3 lakh workers and indirectly to over another 2 lakh workers. But, unfortunately the infrastructure like road, power supply and telecommunication very unsatisfactory. In some districts, the condition of roads is so bad that there are more pot-holes than roads. This has resulted in many accidents. Further, it takes at least 30 per cent to 40 per cent extra time to drive from one town to another. Further, the slow driving of motor vehicles has resulted in the fuel consumption going up by at least 30 per cent, which is not only a national waste but also a drain on our very valuable foreign exchange.

Hence, it can be easily said that the excess fuel, annually consumed in Karnataka as a result of bad roads, should be more than Rs. 1000 crores! This needs to be saved by proper plan of action.

It should be mentioned here that the nature is at her best in the above districts. If one stands at the top of Mullayanagiri, the highest peak in Karnataka, in the famous Baba Budan range of hills, the panoramic view, which greets the visitor, is enthrallingly beautiful. The same sight greets a planter or a visitor from many hill peaks in the above districts.

The famous Persian Poet of the Mogul period, Amir Kushroo did not come down South. Had he come and stood on top of Mullayanagiri, seeing the beauty all round, he would have uttered the same couplet which he had uttered on visiting the beautiful gardens of the Red Fort, viz., —

> "Agar Firdaus Baruye Zaminast,
> Hamin Astho, Hamin Astho,
> Hamin Asth."

Meaning —

> "If there is a paradise on earth, it is here, it is here, it is here".

Though the natural scenery of Malnad District is very pretty, no urbanite wants to stay, let alone visit this area during monsoon months, but, we have been living in this inaccessible and inhospitable areas ever since coffee plantations started here, more than 150 years ago. In fact, for us, the soil of Malnad is our heaven; the lovely hills of Malnad, the rivers and the trees in the forests are our temples and we have solemnly resoved to protect these temples of nature, till time with us is no more.

---

* **From the Chairman's speech delivered by Mr. K.P. Uthappa at the 37th Annual Conference of the Karnataka Planters' Association held in Bangalore on 7th November 1995.**

I should mention here that one of the holy rivers, Cauvery, is flowing through the district of Kodagu and a major portion of the drinking water to Bangalore is from this river. I am sure, Goddess Cauvery will bless all of us, if we look after the Malnad districts well.

We, the residents of these districts, are doing our best to keep the Districts as one of the prettiest Districts of Karnataka, but we require necessary assistance from the Government also.

Hence, on behalf of the people of Malnad Distrcits, I request the Hon'ble Chief Minister to bestow his personal attention, to see that the condition of roads, telecommunication and Power supply are considerably improved, so that, the presently neglected Malnad will become prosperous, vibrant and enchantingly beautiful, with full of enlightened citizens to be truly called 'the Switzerland of India'.

TAXATION ON PLANTATIONS

Though the winds of change, in the form of Reformation & Liberalisation have been taking place in the industrial field of India during the last 4 years, the plantation sector, however, gets the uneasy feeling that it is being bypassed in the reformation/liberalisation process. This sector has not been a beneficiary of the reforms either in the farm sector or in the industrial sector.

To quote a glaring anomaly, the farm sector is exempted from Income Tax while the Corporate Tax level at the centre has been reduced to 46 per cent. However, the Agricultural Income Tax on Coffee plantations continues to be levied at a higher rate of 65 per cent. Since, in the past year, the Agricultural Income Tax collected from coffee plantations has been the highest, at nearly Rs. 45 crores (the previous highest collection was Rs. 15.5 crores in 1989/90) and since a major portion of it, nearly 88 per cent, has been collected from the corporate sector, we sincerely request the State Government to reduce the maximum rate of income tax on corporate sector to the Centre's level, so that, the reliefs given could be ploughed back for the all round improvement of the property and also for investing in various social welfare schemes & activities in their respective districts.

In addition, the corporate sector has been singled out for a harsh treatment by treating the coffee growing companies as a dealer by imposing a levy of 5 per cent Sales Tax under the Karnataka Sales Tax Act. This has come after the earlier harsh treatment of levying Sales Tax on pepper. The inequality in singling out the corporate sector is rather a discriminatory one, which requires to be remedied.

Further, we also request the State Government to reduce the taxation on individuals, which was raised from 50 per cent to 55 per cent last year, to Centre's level.

Here, I would like to mention that the plantation sector has been promoting systematic agricultural development, resulting in the upliftment of rural population, employment generation and small grower orientation. Hence, the plantation sector deserves a steep reduction in the agricultural Income Tax, commensurate with its contribution to national economy.

TAX EXEMPTION FOR GROWER-EXPORTERS

The concept of liberalisation is to provide for growth of industries. As the Hon'ble Finance Minister is aware, when there was a balance of payment crisis, the Commerce Ministry issued a statement stating "Export or Perish" indicating that exporting articles or commodities should be encouraged. However, so far as the plantation crops are concerned there is no incentive for the grower-exporters. This anomaly could be removed by introducing a provision in the KAIT Act analogous to the one in Sec. 80 HHC of the Central Income Tax Act wherein profits derived from the export of one's own produce, directly by the grower-exporter is exempted from tax. This tax exemption on export of plantation crops is being sought, so that, a sort of parity is brought between the grower-exporters and merchant-exporters. This would result in minimising the unfair competitive edge of the merchant exporters. The grower-exporters are often forced to sell at lower prices and have to bear the burden of high taxes which makes a substantial dent in the profits of the growers. When the Government is exhorting all producers and manufacturers to increase their exports, taking into account the excellent track record of foreign exchange of nearly Rs. 1000 crores earned by Coffee last year (out of which, Karnataka's share is nearly Rs. 700 crores), we sincerely request the Hon'ble Finance

Minister that this serious anomaly should be rectified, so that, the grower-exporters will get the benefit which will motivate them to produce more of premier quality coffee for exports, besides rendering our coffee globally more competitive.

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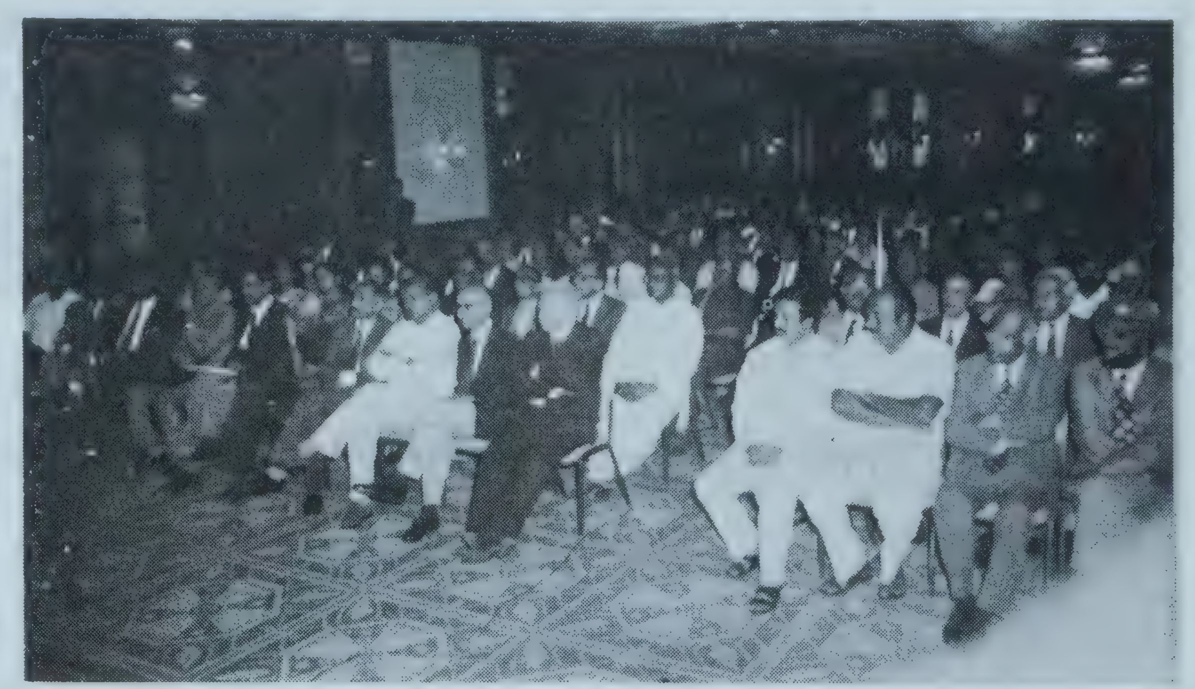
Here, I would like to quote a news item which appeared in the Deccan Herald on 2nd September 1970, under the caption **"Coorg Coffee 'World's Best' "** :

US Ambassador Kenneth B. Keating, for many years a connoisseur of coffee, described the coffee from Coorg as the "Best in the World".

The Ambassador noted that he had become attracted to Coorg Coffee from almost the day of his arrival in India. Since his first cup, he said, he has partaken of nothing but Coorg coffee at his official residence, in New Delhi.

The message from the above is clear to all of us, viz., to try to re-establish Coorg Coffee/Mysore Coffee as world's best, with the active support of the State Government.



A Section of the audience

PURCHASE TAX/SALES TAX

The Incidence of Purchase tax and Sales Tax on coffee is discriminatory among the growers and also in relation to other cash crops. All other industries have tax holidays unlike plantation crops, for which there is no tax holiday under KAIT Act. Partial FSQ of coffee has only opened up the market for growers in the past 2 years and this situation should be treated akin to the new industries started in the State where tax holidays are provided for growth and consolidation. This is particularly so in view of the fact that temporary boom in coffee for a year or so is no penacea for the ever galloping cost of inputs and continued higher tax incidence. Hence, we request the Hon'ble Finance Minister to abolish Purchase Tax/Sales Tax on plantation crops. In any case, the Government will not lose revenue if an effective machinery is built in for collection of revenue on value addition on plantation crops.

As all our members are aware, Hon'ble Shri H.D. Deve Gowda had presided over our annual conference in November 1992 and I quote below a paragraph from his speech :

"Anyway, I will join hands with you, I will co-operate with you and I will try to ask the administrators and the concerned people to look afresh without any biased opinion and see something is done regarding Purchase Tax and Agricultural Income Tax. I can only assure you, as a Member of Parliament, what little contribution I can make for the improvement of the growers, without any reservations I would like to say that I will try to fight for the cause of the coffee growers, farmers or paddy growers".

Now that Hon'ble Shri H.D. Deve Gowda is the Chief Minister of the State, I am sure, he will have in his mind what he had said 3 years ago and do the needful.

INVESTMENT DEPOSIT SCHEME

We are thankful to the State Government for making a beginning in introducing the Investment Deposit Scheme under the KAIT Act during this season. However, the scheme falls short of the requirements of the industry in many

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aspects. Hence, we request the State Government to reconsider and broad base and enlarge the scope of Investment Deposit Scheme to make it more practicable in the interest of the plantation industry. The present scheme provides for a deposit of a sum equivalent to 5 per cent of the total agricultural income, which includes the replanting allowance granted earlier. Taking into consideration the biennial nature of coffee, this is very low and hence, we submit that this should be raised to at least 30 per cent.

The year has been a memorable one in many respects. The coffee boom ushered in an era of prosperity and the small growers got freedom to market 100 per cent of their produce. It is optimistically hoped that the large growers will also get full freedom to market their entire coffee, soon.

SUB COMMITTEE FOR PLANTATION POLICY

The Government of Karnataka had earlier assured us that they would constitute a Sub Committee for formulating a Plantation Policy in Karnataka, to look into all aspects of Government's policies towards the Plantation Industry, particularly in respect of various taxes levied on plantation crops and to suggest modifications and improvements to these policies for the long term benefit of not only the plantation sector but also the State. We had even submitted a memorandum to the Government, suggesting the terms of reference but for some reasons this Sub Committee has not been constituted so far. Hence I suggest the Hon'ble Chief Minister to constitute this Sub-Committee on the basis of the terms of reference submitted by us, similar to the Finance Committee at the Centre which would go a long way in formulating a comprehensive Plantation Policy for the State. As the Hon'ble Finance Minister may be aware, at the Centre, a Finance Committee is set up annually, to look into the various aspects of Taxation and to submit a report to the Government much before the annual budget. We suggest that a similar Finance Committee can also be set up in the State.

LIBERALISATION

The new and challenging role of planters is found in the letters contained in the word 'PLANTERS'.

P - for Planning his weekly, monthly and yearly works.

L - for Leadership, about which I am dealing separately.

A - for Action. In our day-to-day work, we should involve ourselves in productive, useful and noble actions.

N - for Nature nurturing.

T - for Thinking. Every day, a planter should spend about 15 minutes for introspection and think on ways & means to improve production and productivity.

E - for Excellence. We should endeavour to make each of our Estates/our Curing Works a show piece of excellence.

R - for Righteousness. By following the path of righteousness in our life, we can proudly become honourable citizens of India.

S - for Success. Success is the ability to be happy and make othes who come in contact with us, happier. I will be dealing with the role the planters will have to play, as leaders and to be successful in life. We should become world leaders, in production, in curing and in marketing the best quality coffee for export, so that, the name of 'Mysore Coffee', which had a History, Romance and Name prior to 1942, will establish itself as a Speciality Coffee, the world over.

Mr. R.H. Elliot, in his book "Gold Sport and Coffee Planting in Mysore", published in 1896, had mentioned that coffee from the Baba Budan hills, for many years, had fetched the best prices in London market and the coffee from his own Barchanahalla Estate fetched the top prices in London for a very long time. So why con't the Baba Budan blue mountain coffee establish itself as one of the world's best coffees?

This requires a well thought-out plan of noble and productve actions, nurtured in the serene atmosphere of the nature of Malnad, tirelessly following the path of righteousness with the aim of producing and marketing the best coffee and success will be ours.

Recently, the chairman of a leading company mentioned to us that in every field wesould aim at becoming NUMBER ONE, if not, we are ZERO. Here, I would like to quote H.W. Longfellow :

"The heights by great men, great leaders and great planters reached and kept were not attained by sudden flight, but they, while their companions slept, were toiling upward in the night", — like the enlightened planters of Karnataka.

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The Mysore Plantations Limited

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Post Box No. 12
Koppa - 577 126

A. Ramesh Rao

Managing Director

The leadership of tomorrow will have to focus on heroism, courage & fearlessness and, in producing heroes, who, with their noble thoughts and noble ideals, will inspire generations & generations thereafter. If there is one word that you will find coming out like a bomb, from the Upanishads, bursting like a thunderbolt, it is the word 'ABHAYA — fearlessness/courage. Without courage, it is difficult to build; it is difficult to win people's commitments. Teams and organisations would follow a leader, with the ability to motivate, to inspire and to stand tall; to stand firm, with a conviction to represent properly the problems of the industry to the Government and get the required reliefs.

ENVIRONMENT

As planters, we are lovers of nature and hence are very concerned about the environment, particularly regarding the protection of trees. Here, it should be mentioned that a planter has converted an unorganised jungle into an organised one. Further, I would like to mention that in the District of Kodagu, thanks to the farsightedness of our forefathers — near every village they had earmarked 5 to 10 Acres as Sacred Groves (Devaracadoos) and since they had attached a tag of divinity to these groves, all the trees are intact, so much so, in some areas, the overhead canpy is so thick that even sun light cannot penetrate and if one has to listen to the sound of silence, he has to visit these groves.

It is the aim of the present generation of planters that we should not only protect these Sacred Groves, but also establish many such groves, as a present to posterity, remembering that a beautiful forest is a garden of God, planted and tended by the Master Gardener. Here, I would like to use a quotation from Abraham Lincoln's famous Gettysburg address —

> "The Sacred Forests of the people, by the people, for the people, shall not perish from this earth".

COMMUNITY DEVELOPMENT

A suggestion is made that as the Coffee Industry is enjoying a spell of prosperity, we should involve ourselves in the development of the community and the welfare of its people. Here, I quote a paragraph from the late Mr. J.R.D. Tata —

> "The most significant contribution organised industry can make is by identifying itself with the life and problems of the people of the community to which it belongs, and by applying its resources, skills and talents, to the extent that it can reasonably spare them to serve and help them."

In this connection, I am happy to mention that our largest member, Consolidated Coffee Limited, has forged ahead in actively supporting the establishment of "Coorg Foundation", with financial assistance to the extent of Rs. 5 crores, whose mission is to re-generate the inherent strength and agro-diversity of this beautiful region, promote the welfare of the Malnad region of Kodagu and restore the pristine glory of that District. In addition, this Company is involved in giving technical assistance and advice on planting matters, including free inputs, to over 150 very small growers, having 1 to 2 acres, with the idea of improving not only their quality of living but also their coffee production and productivity. This Company is also involved in giving total assistance to the management of the Rural India Health Project, a referral hospital under Plantations Labour Act, whereby the health services in the District of Kodagu are being supplemented. I would like to congratulate the management of Consolidated Coffee on their noble and benevolent actions.

Further, many growers have donated large amounts for the establishment and running of hospitals and schools in their districts and I am grateful to them. It is my sincere wish and prayer that more planters and their wives will involve themselves in Community Development and Social Welfare.

In this connection, we have already submitted a memorandum to the Government, wherein we have requested that the quantum of benefit under Rule 5 (a) or KAIT Rules be restored to the previous level of 10 per cent, as it will go a long way to enthuse the KAIT assessees to contribute more liberally towards charitable causes.

I would like to end this topic with a quotation from George Bernard Shaw —

> "I am convinced that my life belongs to the whole community; and as long as I live, it is my duty and privilege to do for it whatever I can; for the harder I work the longer I live; the more I give, the more I get. I rejoice in life for its own sake. Life is no brief candle to me. It is a sort of a splendid illuminating torch which is given to me, by the great Architect of the Universe, for a

moment and I want to make it burn as brightly as possible to brighten the lives of my fellow men before passing it over to future generations."

VISION 2000 AD

The plantation industry in Karnataka should have these points for implementation :

1) To achieve an yield target of over 3 lakh tonnes by increasing both production and productivity. This is possible by increasing the production from the present 860 Kgs per hectare to over 2000 Kgs per hectare.

2) To create a brigade of non-drinking workers by motivation and total involvement. Here I should mention that at least in 4 estates, this has been tried and in one estate 75 per cent of the workers have taken a non-drinking pledge and in the 2nd estate – 45 per cent, in the 3rd estate – 25 per cent and in the 4th estate – 20 per cent. This will go a long way in not only reducing absenteeism, since as per a survey conducted by UPASI, one of the major causes for high absenteeism is alcoholism, but also help in improving the health of the workers, which will result in improved productivity. Further, there will be peace & harmony in the lines.

3) To help our workers to become thinkers & performers and endeavour to transform them into noble human beings.

4) To plant Flowering tree saplings in the compounds of the bungalows, staff quarters, labour lines and along the boundaries of the estates and also to see to the planting of these on either sides of the village roads, schools & hospital compounds, so that, when these are in bloom, the entire plantation area will appear as a paradise on earth.

Here, I would like to quote Emily Grillet :

> "We shall pass through this world
> but once;
> Any good things or any kindness
> that we can show to our fellow human beings, let us do
> it now;
> Let us not defer it to an another
> day, for we shall not pass this
> way again".

Helping to transform our workers into noble human beings and planting of fruit & flowering trees by the way-side, for the benefit of others, are some of the good things that we can do during our stay on this lovely Planet.

IIPM

Thanks to the efforts of UPASI and with the consent and support of the State Government, the Indian Institute of Plantation Management was set up in Bangalore last year with the idea of imparting knowledge to both the plantation executives as well as proprietary planters, so that, they become 'Excellent Managers' and 'Excellent Planters', for in the present management scenario, acquisition of knowledge is part of business.

Swami Vivekananda was known as a 'Wandering Monk'. He inspired many individuals and institutions. The new and innovative reach out model of the Indian Institute of Plantation Management, Bangalore, has also been inspired by ideas of such great institution builders of our nation. Under its on-site education approach, IIPM has been providing management training programme for the benefit of the plantation industry. During the current year, Karnataka Planters' Association in collaboration with IIPM conducted short term executive programmes for its members. I also thank the Ministry of Commerce and the State Government for their initiative to establish such an innovative institution that is easily accessible.

I visualise IIPM as an intellectual support centre for the plantation managers and also visualise it as a preparatory base for the future generations of enlightened leaders in the plantation sector.

Government of Karnataka was kind enough to promise land for the Institute. I understand that the present Government has already taken initiative in this direction. I take this opportunity to request the Hon'ble Chief Minister to expedite the process for grant of land to IIPM.

INDUSTRIAL RELATIONS

I am happy to mention that during the year, we signed a record 7 settlements, both with Staff as well as with Labour Unions. As a result, there should be industrial peace in the State for the next 3 years. We had very cordial relations with all the Union Leaders, during the year.

Though we have signed a tripartite wage agreement for workers, the Government has still not notified the Minimum Wage. Hence, we request the Government to notify the same early. ✪

CHIEF GUEST'S REPLY

Extracts from the speech delivered by Sri H.D. Deve Gowda, Hon'ble Chief Minister of Karnataka, at the 37th Annual Conference of the Karnataka Planters' Association.

"In this connection, I would like to mention that in the speech made by Sri K.P. Uthappa, two or three points have not only impressed me but also opened my eyes. From his speech, I would again like to bring to your attention one or two points of the quotations which have inspired me a lot."

"I would like to end this topic with a quotation from George Bernard Shaw :

"I am convinced that my life belongs to the whole community; and as long as I live, it is my duty and privilege to do for it whatever I can; for, the harder I work the longer I live; the more I give, the more I get. I rejoice in life for its own sake. Life is no brief candle to me. It is a sort of a splendid illuminating torch which is given to me, by the great Architect of the Universe, for a moment and I want to make it burn as brightly as possible to brighten the lives of my fellow men before passing it over to future generations."

"It is an occasion for all of us who have gathered here, today, to think very deeply on the message contained in this quotation. We are all one and we are all gathered here for a common purpose in which no one is an exception. How great and noble this feeling is! What Bernard Shaw had said has enlightened me a lot and I am sure, you too were enlightened by it, which made you to express those noble thoughts so nicely and effectively. What a grand and beautiful occasion is this!"

"From this, I can truly understand how much you are concerned about the poor and the down-trodden in the society and your sincere desire to uplift the poorer sections of the society. I have heard a number of speeches and usually we, politicians, deliver speeches which differ from the rest. I have heard the speeches of many people during my 30 - 35 years of political career, but your speech is unique, for, it straight away impressed me since it came from your heart with full of feelings."

"From the outer appearance, it appears that you belong to the richer class in the society. I am not interested in debating as to what actually is in your heart. In general opinion, you seem to belong to a richer community. What I am interested in is that, today you have expressed a part of the biography of Bernard Shaw, which has full of deep meaning and I accord it high esteem & respect and, I have no hesitation in saying on this occasion that it has really opened my eyes."

"I have been very closely studying the important points made in your speech. In another part you have quoted Emily Grillet -

"We shall pass through this world but once;
Any good things or any kindness that we can
Show to our fellow human beings, let us do it now;
Let us not defer it to an another day,
for we shall not pass this way again." - and had said :

"Helping to transform the quality of life of our workers and also giving them a helping hand to become noble human beings and, planting fruit & flowering trees by the way-side, for the benefit of others, is some of the good things that we can do for others, during our stay on this lovely planet."

"Today, the message contained in these two quotations have immensely impressed me. From this it is clear that you, as Chairman of the Association, have thoroughly understood the various problems of the Association as well as that of the society and keeping those things in mind, you have strongly put-forth your problems before the Government, which clearly indicates your keen interest, zeal and dedication in solving the problems faced by the society. Hence, I take this opportunity to congratulate you on behalf of the Government."

Mr. Shireesh Gurjer, KPA Vice-Chairman, proposing the vote of thanks. Others : Messrs. Siddaramaiah, Karnataka Minister for Finance & Planning, Science & Technology, H.D. Deve Gowda, Karnataka Chief Minister, K.P. Uthappa, KPA Chairman, M.C. Nanaiah, Karnataka Minister for Law & Parliamentary Affairs, Information & Broadcasting and Vijay Karnad, KPA Secretary.

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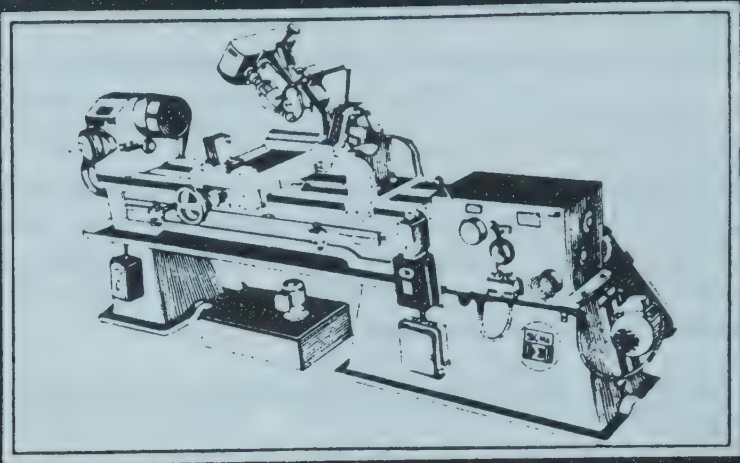

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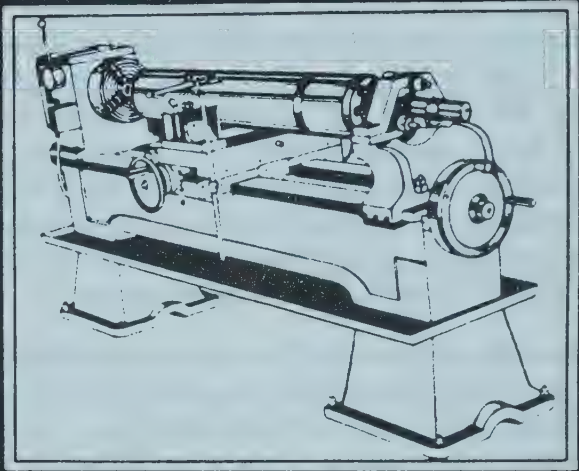

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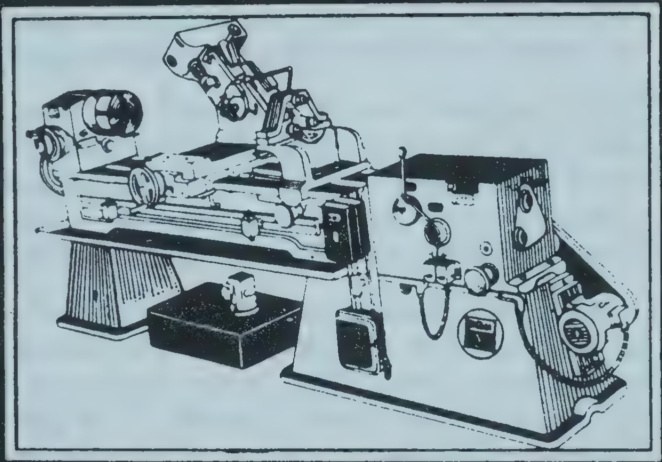

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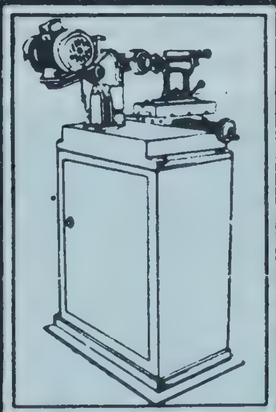

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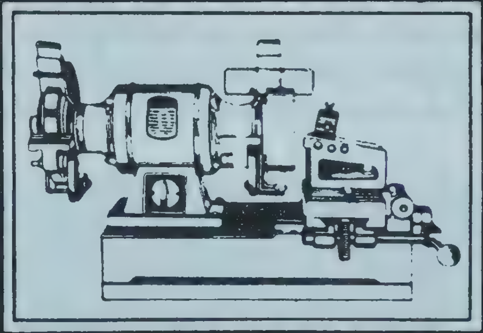

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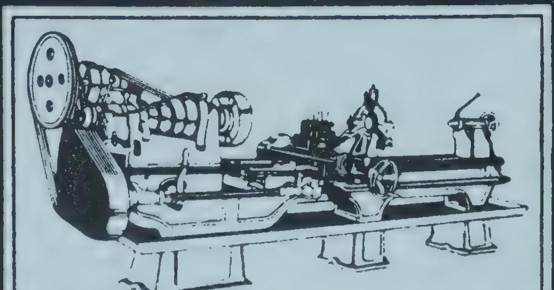

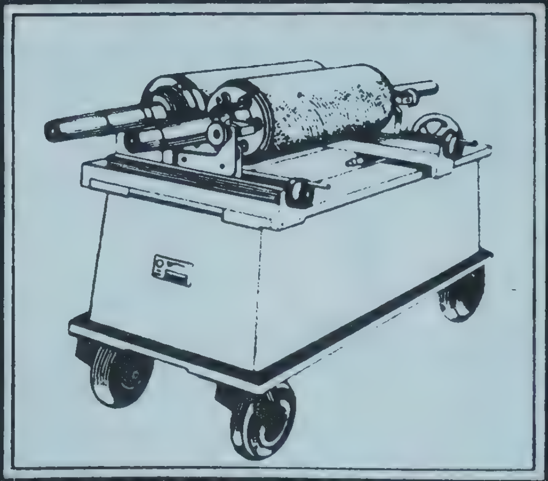

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UPASI KPA COFFEE CONFERENCE

The UPASI-KPA Coffee Conference was held in Bangalore on 6th November 1995. Mr. K.P. Uthappa, Chairman, KPA welcomed the members.

Mr. S. Samuel, UPASI President, making his introductory remarks. Others : Messrs. L.K. Vaswani, Managing Director, COMARK, Philipose Matthai, Coffee Board Chairman, K.P. Uthappa, KPA Chairman and I.J.J. Rebello, UPASI Coffee Committee Chairman

In his introductory remarks, Mr. S. Samuel, President UPASI, pointed out that coffee was the lifeline of Karnataka and growers of the crop played a vital role in the economy of the State in terms of employment and income generation. He noted that the area under coffee, its production and productivity as also exports have gone up substantially during the course of the last 20 years. Arising from the global supply-demand situation, coffee prices had gone up. In this context, he stressed the need for further accelerating the growth of production in the country and he mentioned that there was scope for improving the land and labour productivity. R & D can play a vital role towards this objective. Pointing out that after nearly half a century, the coffee growers were provided freedom on the marketing front, he requested that 100 per cent FSQ be granted to all the growers. He also appealed to the State Government to rationalise the structure of agricultural income taxation so as to make it conducive for growth and development of coffee plantations.

The Sessions were chaired by Mr. I.J.J. Rebello, UPASI Coffee Committee Chairman.

In his keynote address, Mr. Philipose Matthai, Coffee Board Chairman, informed that the Board has already recommended to the Government that 100 per cent FSQ be granted to all the growers in the 1995-96 season. He mentioned that the coffee industry and the Board were partners and their objective was the same viz. developing and promoting the industry. He indicated that there is a fall in domestic consumption of coffee arising from high prices. He, therefore, stated that it was in everyone's interest to keep prices within reasonable levels. This should be achieved, he added, not by control mechanisms but by increasing yields nd reducing costs. In this connection, he stressed the need for effective pest and diseases control management, at the same time avoiding excessive usage of chemicals. He also called for cooperative efforts on various fronts by the coffee growers. He also sought the involvement and assistance of the State Governments towards developing and promoting the coffee industry. The need for promoting consumption of coffee nationally and internationally was highlighted. A small dent in the North, East or West of India, Chairman pointed out, could have a tremendous influence. He noted that arising from freeing the marketing controls, R & D and promotion will be the key future role of the Coffee Board. He mentioned that the field visits by the Development Officers of the Board will be strengthened and there will be more interaction between the growers and the Board's Development Officers. While on the subject, he sought the suggestions of Associations like UPASI as to how best the research and extension set up of the Coffee Board could be reoriented to the benefit of the growers.

Mr. Shireesh Gurjer, KPA Vice Chairman, proposed the vote of thanks.

COFFEE MARKETING IN THE CHANGED SCENARIO

Dr. L.K. VASWANI*

The history of coffee and coffee industry in India is similar to that of a 'silent revolution' first under the British Raj and then under Coffee Board. Consequent upto its deregulation in the recent past, the industry has entered into a turbulent phase to face new realities of a free market. With the exit of State as controller, the industry has to channelise its energies towards a growth path and make desired impact where it matters most. This paper addresses to the most important challenge i.e. the marketing agenda of the coffee industry. An attempt has also been made to analyse the dynamics of global coffee trade and how Indian coffee industry can manage this dynamics to establish its own identity in overseas markets. It goes on to suggest specific initiatives by the industry to restore domestic consumption and impose self regulation to manage its macro environment.

GLOBAL COFFEE TRADE

The coffee production is confined to less developed countries (LCD's) in Latin America, Africa, Asia and Oceania. The economies of these countries are mainly dependent on agriculture commodity exports. The compulsions of revenue generation forces them to produce more than world consumption. This makes coffee a bearish commodity. Secondly, the perennial nature of the coffee crop makes its supply inelastic to changes in prices, both in the short as well as in the long-term. The surplus supply situation in general, occasionally turns into deficit driven by adverse weather conditions than by acreage under coffee. This phenomenon leads to boom-bust cycle in international prices. Historically, the boom period has also led to over-investments in coffee in producing countries causing long-term periods of over supply and long-term price depressions.

In addition to economic compulsions of the coffee producing countries and inherent limitations of the commodity itself, the distinct identity of the producing and consuming nations also influences the dynamics of global coffee trade. Both these groups try to influence the price to go their way.

The arrangements to tackle such situations in the past, either under ICO (which collapsed in 1989) or Association of Coffee Producing Countries (ACPC) from September, 93 onwards, were limited to supply control. The critics of ICO point out that such arrangements "are no more than of international sanctioned producers Cartel" and have resulted in higher price for member countries and lower prices for non-member countries. The theorists on the other hand, while analysing such arguments nearly proved that the behaviour of Brazil and Colombia, the two largest exporters of coffee, was closer to price takers rather than collusion. It was 'supply explosion' which brought ICO agreement to an end.

The ACPC intervention in 1993 coupled with smaller crop in Brazil in 1994 resulted in 'price explosion'. The adverse impact was high consumer prices and inturn fall in world consumption by 10 per cent. It is for this reason that the ACPC supply control intervention of 1995 is being resisted with all the force by trade in consuming nations. The inability of the international market to push higher is being mainly attributed to a strong line by international roasters who are preferring to stretch stocks to the maximum in anticipation of another 'supply explosion' in near future. The market warfare has become so bitter that Executive Director of the EL Salvadorean Coffee Council have accused that coffee prices in coffee, sugar and Cocoa Exchange (CSCE) are being manipulated. Even when this market warfare is hotting up ICO is trying to revive itself. Mr. Celsius Lodder, Chief Executive of ICO has rightly but it - "volatile prices harmed both exporters and importers but there was little prospect" in the near future that the two sides could act together to bring coffee market back under international regulation.

The other possibilities which can help producing nations to overcome volatility in prices of the commodity is the value added exports. Unfortunately, the spread of coffee processing activity suggests that the primary processing is limited to exporting countries, while a product manufacture is located in consuming countries. As a result, the export of processed coffee have never exceeded 5 per cent of the world coffee exports.

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* Managing Director, COMARK.

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The other avenues which are available to reduce volatility in coffee markets have their limitations. The future markets which primarily reduce the adverse effect of fluctuations in prices are inherently limited in their price signaling role in case of a perennial crop like coffee. Even, if one assumes that future markets are efficient, yet they cannot influence resource allocation in the long run. Lately, serious concerns have been raised regarding venerability of future markets on technically driven liquidation by funds even when fundamentals are strong.

PAST AND FUTURE

Indian Coffee Industry which contribute 3.2 per cent of the world's production and 3 per cent of the world exports is relatively small to make any significant impact in changing the dynamics of world coffee trade. On the other hand it can easily get influenced by developments in the international market. In long years of its existence, the Indian Coffee is far short of creating an identity in overseas market, which is necessary for its survival and growth. The reasons for such failure can be attributed to total State monopoly and excessive State regulation imposed on the industry in many different ways. With the turn of events beginning 1992, the industry has been deregulated to a greater extent but fear of State regulation in one or the other form still persists. It is a matter of time before remaining regulations give way to a free market.

At the same time if one look back as to what the industry has achieved in last 3 years of deregulation, the inference is that the market distortions have multiplied. The conflict between growers, industry and state has grown. The domestic consumption has fallen. It may take few years before market process takes care of these distortions through new adjustments at various levels.

The challenge before the coffee industry is to hasten the pace of these adjustments leading to better market coordination i.e. the way linkages in the market chain are established and how the industry regulates itself.

MARKETING COORDINATION

Exports : In the recent past, bulk of Indian Coffee (59 per cent in 1989-90) was being exported to USSR under bilateral agreement. In the light of the political and economic developments in the erstwhile USSR, the direction of Indian Coffee Exports started shifting to hard currency areas from 1990-91 onwards. The shift was facilitated by smaller coffee tradeable surpluses in 1994 and 1995 in the world market. By 1994-95, West Germany, Italy, USA and Japan accounted for 53 per cent of Indian Coffee exports. Whether Indian coffee exports can be sustained to these countries when surplus supply situation in world markets is restored and cut-throat competition from major coffee exporting countries comes back in to play is to be seen. The message has come clear and loud from Europe's first Speciality Coffee Conference held recently in Venice. "Get rid of the world of poor tasting coffee". Given the disadvantage of only 3.0 per cent share in global coffee trade, the choices before Indian coffee exporters are limited to sustain and even expand into more competitive markets of USA, Europe, Japan and Austrialia.

Conceptually, market share and marketing approach in general can be linked as depicted in Fig. 1.

GLOBAL MARKET SHARE

	HIGH	LOW
COUNTRY SPECIFIC	QUANTITY ORIENTATION	VALUE ADDED ORIENTATION
BUYER SPECIFIC	QUALITY & QUANTITY ORIENTATION	QUALITY ORIENTATION

Fig. 1 : Relationship between Market share and Marketing approach.

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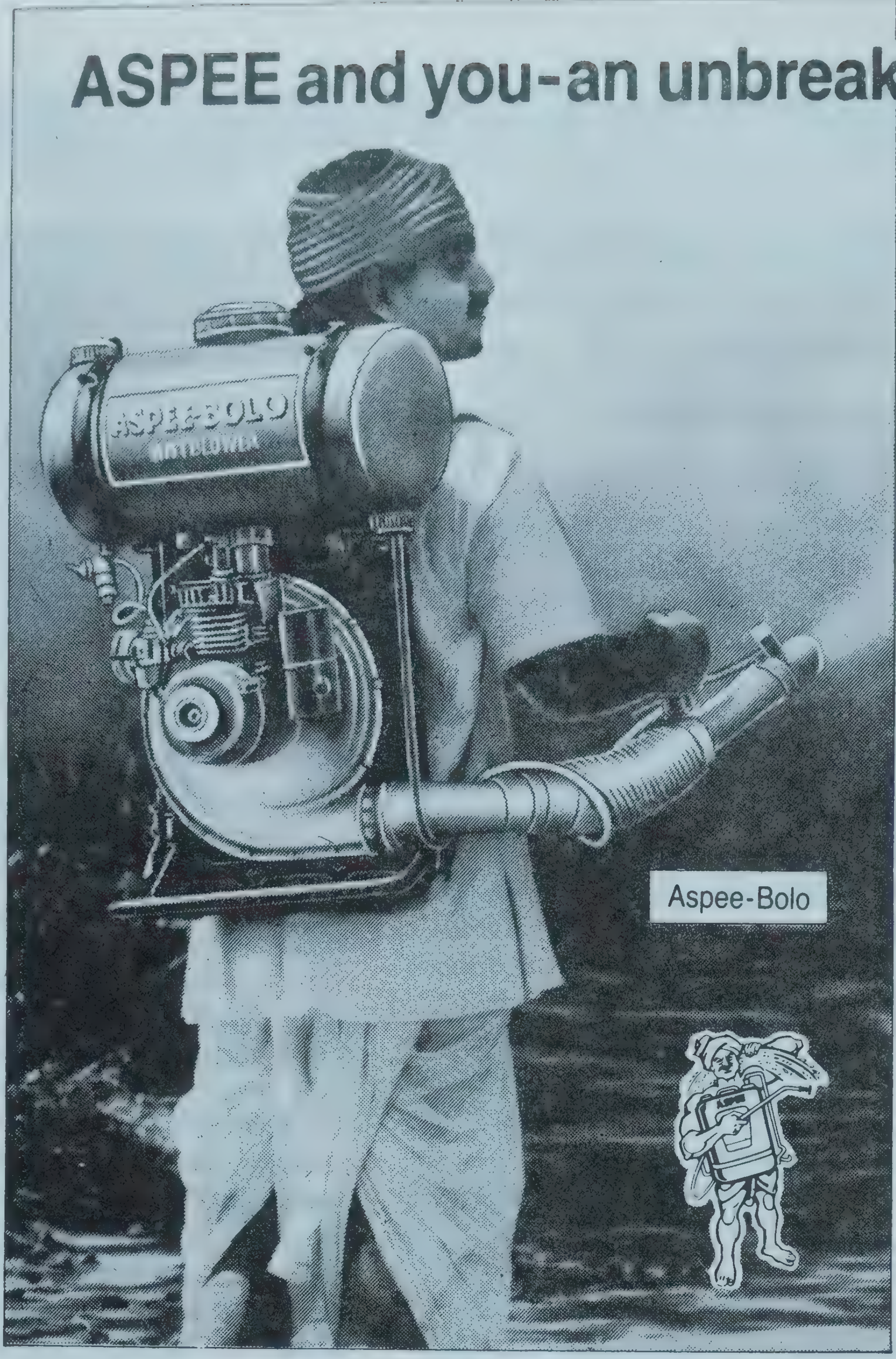

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Through the chilly
winter months. You
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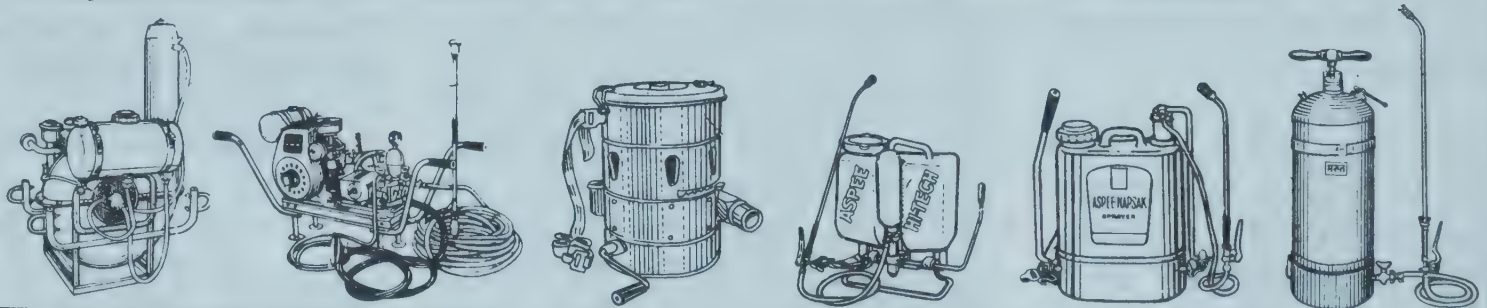

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India with its low market share, obviously have to follow two of the four option available (Fig. 1). The best can be value added orientation which would mean supply of Indian speciality coffees like Monsoon coffee, Mysore Nuggets EB or launch of Indian Coffee brand abroad as done by Colombia. The first alternative offers limited possibilities while second alternatives can be implemented in smaller volumes as "image booster" for Indian Coffee.

A new orientation to exports through buyer (roaster) specific approach seems to be feasible to achieve reasonably good volumes. In the context of coffee it must be remembered that if a consumer segment associates itself with a spectrum of coffee brands, the roaster has to guarantee the quality stability with regularity of supply. This in turn will heavily depend consistency of characteristics of their raw material. Therefore, the most difficult task for a roaster is to offer the same quality regularly. The Indian coffee known for its attributes of 'good blender', therefore will fit well into buyer specific option, to the extent that the demand of individual roasters can be met.

The buyer specific marketing approach cannot be implemented through open market transaction and calls for realignment of productionmarketing system. At present, such coordination signals. This has led to a quantity oriented production system with little or no incentive to the growers to produce a better quality coffee. Such risky market transactions have to be replaced by production contracts – contracts for delivery of a specific quantity and quality at a specific time. The prices can be predetermined or can be based on spot market prices at the time of delivery. Production contracts can ensure assured supplies of consistent quality to exporters. This will also require a complete change in the operational style of Indian exporters and such arrangements also require conscious cooperation of growers. The task will be difficult in the present environment as the growers will not like to commit themselves. They generally feel that they gain more by remaining uncommitted. The basic concepts of market growers have not realised that they are the one who will suffer from long periods of price uncertainty. The Contracting arrangements can offer them price stability, access to specialised production expertise, information on consumer needs and supply of inputs, the ways and means of conducting business.

It is certain that Indian coffee has to move from low cost commodity orientation to a market niche strategy (focus) as described above. To survive in global coffee trade, where supply gluts accompanied by long periods of price depression are common phenomena, Indian growers, the exporters and the State have to work in harmony so as to respond to the needs of the market. The answer is quality. This approach is the best response to our strengths in quality and weakness of low market share in the global coffee trade.

Domestic markets : Domestic consumption of coffee which was around 65,000 M.Ts in 1991-92 and continues to be on the decline. A market survey conducted by COMARK in mid-1995 in selected non-metro markets of southern States indicated that decline in consumption varied btween 20-50 per cent. This must be a cause of serious concern for the coffee industry. The fact is that the domestic market continues to be badly hit in terms of reduced availability and high prices inspite of fall in international prices of coffee during the current year.

The single important reason for this phenomenon is the existing structure of coffee industry – exporters and domestic dealers operate as independent entities and each competing for the share of produce. Further, the ability of domestic dealer to compete is far less than that of a exporter, particularly, in a situation when international price rise abnormally and all the coffee finds easy way to overseas markets as happened in 1994-95. However, it makes lot of sense to sense develop domestic market to its full potential. The reasons are :

1) Short periods of scarcity followed by long period of surplus supply is a unique feture of coffee industry at global level. Well developed domestic market can provide cushion against fall in demand and prices in international market.

2) Domestic market pays premium for Arabicas which now receive minus differentials in overseas markets.

3) As State forms an important part of task environment of the industry, a fair treatment to domestic consumer can change the attitude of the state towards the coffee industry. This probably can facilitate doing away with taxation and various regulations which favour retention of coffee for domestic market but render the coffee industry uncompetitive in the world market particularly in situation of glut.

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INTERVENTIONS :

The domestic coffee market can be broadly categorised into roast and ground segment and instant coffee segment. The instant coffee segment is controlled by large firms with well developed marketing network. The products in this segment cater to upper class market. The traditional segment of roast and ground coffee can further be grouped into branded and unbranded segment. The product range in this segment is very wide ranging from branded-packaged coffee to chicory mixed-loose coffee.

Until recent past auctions were the major sources of raw material for domestic market. After deregulation of the industry, the roast and ground coffee segment operates with chain of middlemen between producer and consumer resulting in low price efficiency. It is this segment of the market which needs new interventions. This traditional market segment offers immense potential for enhancing domestic consumption, provided criteria of consumer affordability and accessibility are taken care. The interventions should include :

— Better coordination between large roasters with growers through backward integration. This can lead to better marketing coordination and assurance to buyers with regard to quantity and quality. Such coordination will help in improving the price efficiency of this marketing channel leading to increase in growers realisation in consumer rupee.

— Organisational interventions which link the producer and consumer on profit sharing basis. COMARK intervention in retail marketing of green coffee is a unique in this regard. Overwhelming support to COMARK's Retail Pooling Scheme (RPS) is indicative of grower's support to such intervention. COMARK has plans to extend this concept to benefit consumers by opening franchised retail outlets. It is expected that such intervention is forcing our competitors to a greater degree of market discipline and price efficiency.

As far as domestic consumption is concerned roast and ground coffee holds potential to infuence consumption in traditional urban and rural markets. This is important if target of 3.00 lakh metric tonne production targets become reality by the turn of this century.

I do not share the optimism of others who believe that non-traditional markets offer large room for expansion of coffee. I believe that coffee in non-traditional markets can only become a life-style product or 'for a change' beverage. Therefore, it will be in the interest of the industry to facilitate consumption in 'core market' and leave it to individual firms to develop non-traditional markets.

SELF REGULATION

In order to undergo such strategic orientation as described above, it is necessary that macro – environment (concerning regulations) remains favourable. It must be remembered that Governments do resort to populist measures through regulations. The history of coffee industry is no different. In the recent past State has resorted to measures like export capping (the idea of export duty was not implemented), FSQ for large growers etc. In its long-term interest coffee industry can pre-empt such moves by having its own self-regulatory mechanism. This will ensure that the macro-environment of the industry is favourable for achieving desired strategic orientation.

I am of the opinion that the coffee industry should form its regulatory body which may be called 'Coffee Marketing Regulatory Committee' representing various interest groups namely Coffee Exporters, Domestic Roasters and Dealers, Growers bodies representatives, Consumer and Government. This body will allocate and monitor flow of coffee to overseas and domestic markets to prevent existing distortions in domestic markets and its commitments for exports. Such a body can also play a catalyst role to hasten up the process of marketing coordination between various interest groups in the industry.

CONCLUSION :

Coffee industry in India has moved from a State monopoly to free market. The challenges before the industry are manifold. Firstly, it must manage two important dimensions of its macro-environment i.e. to create its identity in overseas market and pre-empt any adverse moves by the State through self imposed regulation. Secondly, reorganise itself from its existing segmented structure which enables it to achieve higher degree of marketing coordination. More than anything else this will require fundamental changes in the role of each participant in the marketing chain – from grower to exporter/local roaster. Only such leap forward approach can enhance rating of Indian coffee industry in the domestic and world markets.

— **Paper presented at the UPASI-KPA Coffee Conference held in Bangalore on 6th November 1995.**

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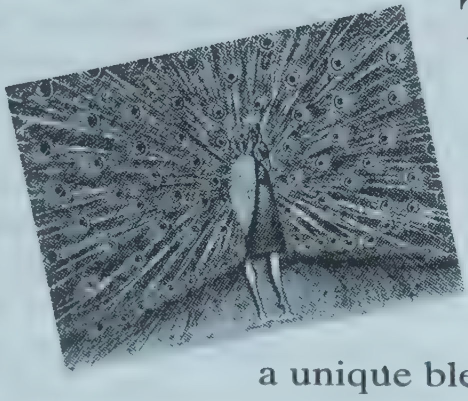

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COFFEE BREEDING IN INDIA

Dr. C.S. SRINIVASAN*

Central Coffee Research Institute has bred a number of coffee selections – twelve in arabica and three in robusta which have supported the industry both in times of need (in 1930's & 40's when yields were low because of leaf rust S. 288 & S. 795 have saved the industry) and in times of prosperity (recent spurt in coffee prices which has encouraged more areas under coffee and for quick returns cauvery is the favoured variety).

At this juncture we have to take stock of the situation and make an assessment as to where we stand and where we want to go, with particular reference to the topic namely "coffee breeding". S. 795 is the first and even today the most successful variety that has been bred at CCRI and became popular with planters because of least problems and consistent yields and quality. It occupies 65 - 70 per cent of total area under arabica even today. Further to this CCRI has bred 8 selections in arabica (Slns. 4 to 12) and given to planters. Initially it was given for trial purpose only. We ourselves did not have information on their performance in different localities. Hence we gave the seed both to our C.D.F.'s and Regional Research Stations and to the planters to assess the performance. Planters who found some varieties to be good, multiplied it themselves on their estates and also gave the seed to near and dear (Eg. Swarnagiri 6, in Siddapur (Kodagu), Cioccie & S. 2931 in Pulneys). Based on the demand for seed over the last few years we can say that Sln. 9 & Cauvery are the most popular new cultivars next to S. 795.

Recent sample survey on the performance of varieties in different zones has indicated that S. 795 is still a good variety followed by Sln. 5 and Sln. 6. Cauvery is of course leading as a variety with high yield. But its shorter life span and susceptibility to rust are disadvatages.

The risk of multiplying a single variety with high genetic uniformity (F_5— F_6) is exemplified by Cauvery which is succumbing to the new races of leaf rust that have co-evolved with this hybrid.

Sln. 8 & 9 carry HDT genes which are so far resistant to known races of rust. Sln. 10 involving 3 parents (Caturra, S. 795 & Cioccie) is also a good yielder and needs popular popularisation.

Sln. 11 is a hybrid of *C. liberica* X *C. eugenioides* with somatic mutation resembling arabica. So far it is free from rust but poor yielding and produces small beans (more 'B' grade). Hence it has been crossed with HDT to improve fruitset and bean size and the results are promising.

Breeding is a continuous process as rust is also capable of evolving new races. Work on improvement of Cauvery by crossing it with other lines has been taken up. Seven crosses worth mentioning are listed. Some of them (4634, 4635, 4638 & Cauvery X S. 881) appear promising. We have to go for multilocation trials. A number of double cross hybrids (involving two single crosses) have been evolved among tall arabicas. These lalso have to be evaluated in multilocation trial. A gene pyramiding model has been developed to combine all the nine factors available for resistance to rust in arabica. Production of F1 seed using male gametocides is also a possibility that, we are exploring. From these will come the future genotypes of arabica coffee.

Systematic interplanting of two or three genotypes in the same field is also expected to ward off rust epidemics, apart from prophylactic and curative fungicides.

In robusta the response to adopt new varieties has been rather slow because of the long productive life of older plantations which continue to yield well (especially with sprinkler irrigation) without much problem.

— **Joint Director (Research) & Head, Division of Botany, Central Coffee Research Institute.**

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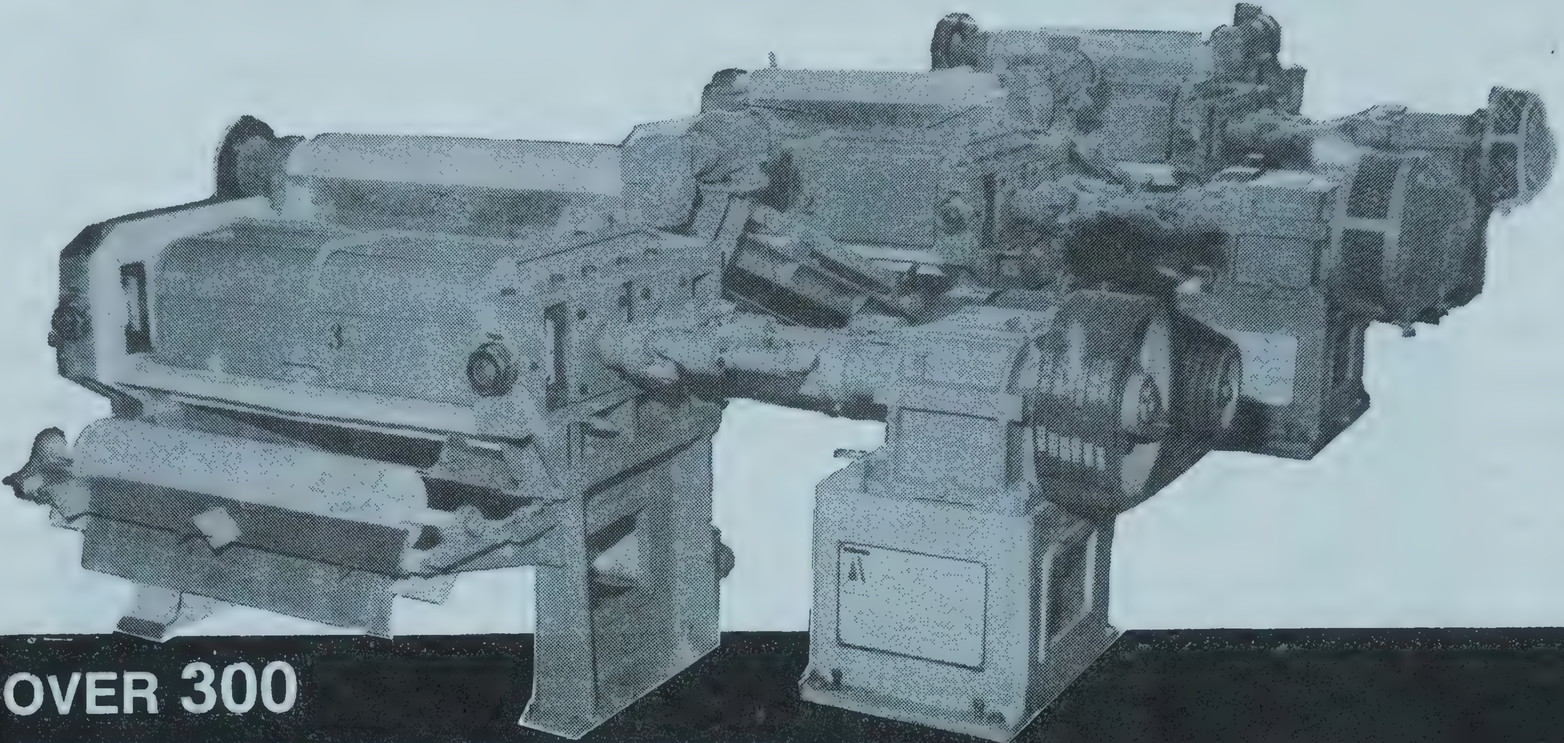

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The evolution of congensis X robusta hybrid and its stabilisation by sibmating recently has been a significant achievement in robusta breeding. The superior bean quality of this hybrid is wel appreciated in trading and soluble coffee circles. Clonal propagation of this material is also gaining popularity because of uniformity for plant characters and early yield.

IN VITRO APPROACHES :

In the recent hybrids involving several parents, segregation in seedling progenies is a bottleneck for achieving uniformity. Hence, tissue culture techniques for mass propagation of elite types in identified hybrid combinations may serve the purpose. Research on these lines at CCRI has resulted in the standardisation of protocols for mass multiplication and regeneration of plantlets. However field performance of the tissue culture plants has to be evaluated for which large number of plantlets are required. In this connection, collaborative approaches with commercial tissue culture firms were initiated. With this the day is nearer to have data on field performance of tissue culture plants as a multilocation trial.

— Paper presented at the UPASI-KPA Coffee Conference held in Bangalore on November 6, 1995.

HORIZONS '96

INTERNATIONAL COFFEE CONVENTION

The International Coffee Convention being organised jointly by the United Planters' Association of Southern India (UPASI) and the Coffee Board WILL NOW BE HELD ON 7TH AND 8TH MAY 1996 IN BANGALORE. In addition to coffee growers and buyers from abroad, leading traders/roasters from USA, Europe and Far Eastern countries are also expected to participate and share their knowledge and experience in the Coffee World.

For details regarding the delegtes' registration procedures, fees, etc. please write to the Secretary General, UPASI, Coonoor - 643 101.

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SPICES FOR FOOD AND DRUG IN ORGANIC ENVIRONMENT

By

KOSHY JOHN

Organic farming is a genuine opportunity for diversification, and it has a number of advantages in the present climate of agriculture thought and the demand for various spices and spices products in the world over for food and drugs. Spices which are aromatic or pungent or colouring materials of plant origin are essential ingredients in food and drugs. The word spice is synonymous with anything that flavours or creates a piquant effect. There are listed now 97 spices which, one way or other, flavour or colour to add spice to our life.

India is a home of spices since time immemorial producing and exporting variety of spices like pepper, cardamom, ginger, turmeric, chillies, coriander, cumin, fennel, fenugreek, celery, garlic etc. Indian commodities like Malabar pepper (TGEB), Alleppey cardamom (AGEB), Cochin ginger, Alleppey finger turmeric, sannam chilli etc., are famous in the international markets.

India, with its favourable climatic and soil conditions for growing a variety of spices, is the largest producer and consumer of spices. During 1994-95 India's estimated exports of spices and spices products were to be around 1.5 lakh M.T. valued Rs. 600 crores. In the global spice trade, India's share presently is of 34 percent in terms of quantity and 13 percent in terms of value. On an average, only 5 percent of India's production is exported. Even with this export, India accounts for 1/3 of the world spice trade estimated 4.5 lakh M.T. annually.

In recent years, there has been a severe competition from other countries such as Brazil, Guatemala, Indonesia, Malaysia, China etc. in the matter of production and exports. To maintain our unique position in international market, it is absolutely essential to improve the crop productivity and quality of the spices.

CONSUMER PREFERENCE

An increasing concern is now discernible among the consumers especially in the USA, Europe and Japan about the adverse effects of modern agricultural production methods on account of excessive use of chemical fertilizers and pesticides used in high production technology. There is, no doubt, greater awareness in quality products on the part of the consumer. The idea of quality centres on organic produce and its demand arises from a growing awareness that the presentation of conventional agricultural products is increasingly uniform, as quality criteria are usually based on standardisation and homogenity. Also, the intenstive use of artificial chemicals, both for fertilizer and for treatment, has given rise to demand on the part of many consumers for more nature products than those of intensive agriculture.

ORGANIC FARMING

Organic inputs provide optimal conditions in the soil for raising good quality crops by supplying major secondary and micronutrients, improving soil physical conditions, protecting the quality of environment and by reducing the total cost of production. Adoption of organic farming further enables to incorporate principles of environmental protection that are economical. This is a part of wider movement for the conservative and protection of the environment. Twenty years back, organic farming had very few proponents. Their claims of success then were anecdotal and difficult to verify. Today, we are in a better position to judge, thanks to a five-year study in which the results of organic farming were compared to those of chemical farming.

And here, the reports put organic farming on top, the concept of organic farming has spread considerably, although it is a small part of total agriculture. Organic farms exemplify how the principles of pollution prevention can be applied to agriculture by reducing environmental emissions due to nitrogen fertilizers and synthetic

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*** SPICES BOARD, KOCHI 682 025.**

pesticides to zero, yielding toxic free residues.

ORGANIC MANURES

The application of organic manures to the soil is a sustainable agro-technique. Organic materials are valuable by-products of farming and allied industries. It covers from cattle dung, excreta of other animals, animal wastes, urban composts and crop residues. Materials such as farmyard manure, composts and crop residues are bulky organic manures. Organic manures can be applied to all crops and all types of soils but rates of application vary according to the soil, crop climate and also to the quantity of manure.

Organic manure contains all the essential plant nutrients including micro-nutrients to increase the plant growth. It improves the soil physical and chemical properties involving soil structure, water holding capacity, drainage and check soil erosion. It has a long term effect on soil fertility which is real basis of a fertile and productive soil. Since it has more residual effect, the manure lasts for successive crops. It increases the availability of nutrients to the plants due to the presence of high humas content, and also enhances the uptake of chemical fertilisers.

High organic matter content of the soil through the organic manure supports the growth and multiplication of beneficial soil micro organisms like nitrogen fixers, phosphate solublisers and phosphate mobilisers. It acts as a binder between soil pesticides and improves soil water retention. The plants become naturally healthy and have disease resistance so that the application of pesticides could be avoided. It is a natural way of farming without causing pollution and disturbing the ecological habit of the region.

VERMICULTURE

With increased awareness on ecological agriculture and natural farming, the interest on earthworm rearing or vermiculture is also gaining ground. Besides, being a good tiller, the earthworms can help in quick decomposition of organic residues in the farm. Agriculture researches have shown that by introducing a large number of earthworms in crop fields, productivity could be increased significantly.

Apart from improving the physical features of the soil, the worms contribute significantly to neutralising its pH and bring about favourable chemical changes. Several soil nutrients that remain in unavailable form are converted into easily available ones after passing through the gut of worms. Being rich in plant nutrients and beneficial soil micro organisms, the vermicastings support luxurious growth of crops, and improve immunity against pests and diseases.

BOTANICALS

Neem tree of India is a potent source as an organic remedy for the control of variety of pests and diseases in the plant life. Every part of neem tree, the roots and the trunk, the leaves and the seeds are used for plant protection, both against field and strange pests. A chemical insecticide contains one poison whereas neem has 127 different ingredients and so insects do not become resistant to neem. Farmers have for centuries been using neem leaves with grain, or soaking storage sacks in neem water to repeal pests. Neem's active substance asadirachtin, was found to be effective in minute quantities to act as a repellent and antifeedant and upsetting the insect's hormone balance so that it becomes permanently incapacited. Let not the use of neem in various forms die out due to the stigma of backwardness attached to the use of traditional materials and practices in agriculture.

A beginning had been made with neem based agrochemical products in the country. Many more plant based products have to find their way to pest control programme to boost the integrated pest management approach. The new emphasis is on environmentally safe pesticides. The problem of pesticide residues have come with focus due to indiscriminate use of different pesticides. The fault thus is also on the pesticide users rather than that of the pesticides themselves. Understanding of the eco-system and effect of pesticides on the environment is absolutely needed in the coming up agriculture.

Besides the neem, about 2400 plant spices have been found to contain insecticidal properties which can be exploited for agriculture pest control. Pesticides drived from them would not only be safe and effective but easily be degradable. The plant derived pesticides would be much sought after in the coming years. There is a premium on agriculture consumables produced by using such safe pesticides. The new safety and health and trading practices disapprove the use of pesticides derived from harmful chemical sources.

INTEGRATED PLANT NUTRITION SYSTEM

The objective is to increase and sustain the crop productivity with minimum disturbance to the environment and ecology. Deterioration in soil fertility and crop productivity that is likely to result from intensive cropping could be minimised by the combined use of chemical fertilisers, organic and bio fertilizers. This strategy attempts to combine the biological and conventional system of agricultural production. In general, the approach aims at maintaining soil fertility at a fairly higher level by biological means and also achieving higher outputs by supplementing the organic sources of nutrients with moderate amounts of chemical fertilisers. In nature, organic and inorganic sources co-exist and travel through the same cycle. These nutrient sources represent great diversity in physical, chemical and biological characteristics and their efficient use depends upon local availability and the particular agro-ecological environment.

An U.S. experience suggests that a minimum of about five years of non chemical agriculture and on the average some what longer is required to restore the natural system of soil fertility and pest management. In the intervening period, income may be significantly lower than that achieved by conventional chemical - based farming. Experts are suggesting agencies to give subsidies to the farmers in the intervening period.

ORGANIC SHIFT

Organic farming differs in a variety of way from conventional farming. It will be marvellous to our own eyes as it does not pollute the soil and ground water with poisons. Organic farming thus :

- Increases biological diversity among plants
- Maintains soil structure and balance of soil micro-organisms.
- Reduces leaching of minerals thanks to concentration on organic matter.
- Depends strongly on natural equilibrium to protect crops, using natural methods of defence instead of regular application of pesticides.
- Makes full use of natural, local and renewable resources.
- Uses low-energy input and thus reduces external dependence of farming.
- Increases, finally the quality of the product by reducing total cost of production.

CONCLUSION

Generally speaking, the home of the game in farming, all over the world, is minimisation of risk, rather than maximisation of opportunity. Successful families have, all long, looked at progressive farming as an occupation requiring a great deal of commitment, into the continuous cycle of farming activities. When the woes of ecological crisis are causing ripples of bewildering changes and concern, an Indian organic spice producer could be in the international network to supply safe spices and spices products for healthy food and drugs.

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SHOOT GROWTH IN TEA

S.B.K. MURTHY*

The cultivated tea bush has a permanent frame with a number of branches. All the new shoots that emerge from the dormant buds on the branches are called primary shoots. The primary shoots are tipped after they reach the predetermined level. After a primary shoot has been tipped, new shoots arise from the axillary buds. When these shoots grow above the tipping level, they are plucked. After completion of tipping, plucking is carried out at set intervals with a view to harvest standard shoots.

Shoots on the plucking table arise from the axillary buds on the stems of previously plucked shoots and also from the growth of banji buds.

PERIODICITY OF SHOOT GROWTH

Freely growing tea shoots pass through alternating states of growth and quiescence. The amount of growth made between two states of quiescence is known as 'flush'.

The apical portion of an elongating tea shoot known as the bud is tightly wrapped in appendages which are not different from any of the expanded leaf except that it is not unwrapped. Leaves unfold from the bud one after another. Unfolding of the ultimate leaf of flush discloses a small bud known as the banji bud which is much smaller than a growing bud. The banji bud does not show any visible sign of growth and may remain in that condition for some time.

When the bud resumes growth to produce a new flush, the meristem at the shoot apex becomes active and lays down initials of a new flush.

With increase in the size of these initials, the bud swells up and after reaching a critical size, starts throwing out janams and foliage leaves of the next flush.

The first visible sign of growth of a new flush is the unfolding of the outermost scale leaf wrapping the bud; this is followed by another scale leaf. These scales drop off almost immediately, leaving behind scars on the stem. Unfolding of janam follows that of scales. Next to these, with a more pronounced affinity to a normal leaf, 'fish leaf' appears. After unfolding the fish leaf, foliage leaves unfold one after another until the banji bud is exposed. The whole process is repeated in due course to produce the next flush of growth.

However, a banji bud may not be formed between flushes on every shoot on a tea bush. In some vigorously growing shoots, particularly in the central zone of a bush, scars of fallen scales are not observed and the stems, at first sight, appear to bear a succession of normal leaves. However, if the size relation between the leaves and the internodes is examined on such shoots after full expansion of the leaves, it is seen that the leaves are smaller and internodes shorter in a zone of the stem which is homologous with the dormant zone on less vigorous shoots that have produced a succession of banji buds. It was observed that the time intervals or phyllochrons between the expansion of successive leaves on such shoots clearly formed recurring patterns.

The cause of flushing and dormancy in tea could be attributed to three factors :

1) Studies in Sri lanka showed that the leaf initials, not less than five in number, were preformed in a bud before it broke for a new flush. Whereas the number of initials dropped to less than three in a dormant bud just after its exposure. Scientists working in N.E. India on a large array of clones, counted initials of 3.25 ± 0.02 in a banji bud soon after its exposure and 6.17 ± 0.09 initials in a bud at the commencement of flushing.

2) The vascular area below the bud was less in an elongating shoot than in a dormant shoot. These observations imply that the growth of vascular tissues below the bud cannot keep pace with the rapid elongation of a flushing shoot. The consequent reduction in the area of the vascular tissue causes a 'bottle-neck' and the apical meristem does not receive adequate supply of water and nutrients to lay down initials. Thus, after

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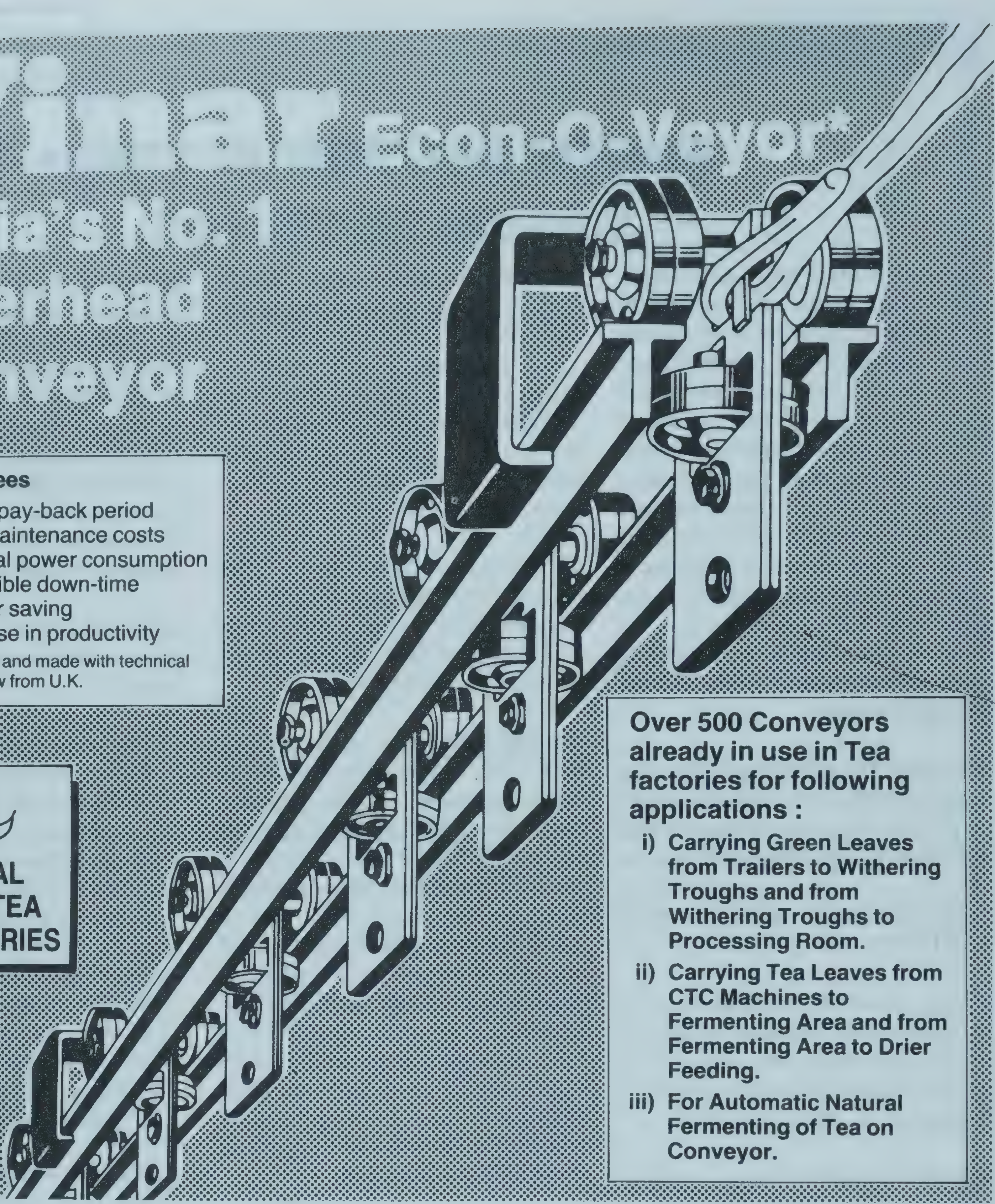
* UPASI Tea Advisory Service, Gudalur - 643 212.



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unfolding the full complement of preformed appendages, the bud comes to a state of apparent rest while the vascular area below it continues to increase in size. After sometime, when the vascular area has enlarged sufficiently, new initials are formed and start unfolding leaves of the next flush.

Length of the flushing and dormant periods the interval between unfolding of successive leaves and janams vary significantly between clones, although neither of these factors could be related to yield.

3) Hormonal regulation of growth periodicity has also been proposed. Reduction in the vascular tissue below a growing bud leading to bottleneck in the supply of water and nutrients to the bud could be the immediate cause of dormancy, but a remote cause must exist to influence the bushes under plucking to exhibit a pattern of growth.

Evidence from subsequent studies indicate that besides water and nutrients, other factors provided by the roots are responsible for influencing shoot growth.

Like shoots, roots of the tea plant also grow in phases, but out of step with the growth phases of the top. Synthesis of certain growth factors takes place in the roots when they grow actively. When sufficient concentration of these substances is built up in the roots, they move up to the dormant shoots to promote a new flush of growth. Meanwhile, the roots get depleted of these substances on account of which their supply to the top is interrupted and the shoots become dormant. With the cessation of top growth, more metabolites are diverted to the roots to induce a new flush of root growth and the whole sequence is repeated.

MAINTENANCE FOLIAGE

All mature leaves, including fish leaves left on the bush below the plucking surface are the maintenance leaves.

The capacity for photosynthesis develops gradually in young, expanding leaves of tea leaves do not attain full photosynthetic efficiency until they expand to more than half their maximum size. Even the third leaf on a growing shoot is photosynthetically less efficient than a mature leaf of equal size. Hence, young shoots on a tea bush develop at the expense of photosynthates produced by the maintenance foliae. The young expanding leaves gradually take up the burden of manufacturing their own needs and in due course, they pass from being liabilities to becoming assets to the plant. However, the shoots are plucked at such a tender age that the young leaves do not get a chance for out-living their dependence on the metabolites supplied by the maintenance foliage.

Besides supplying carbohyarates for the growth of successive crops of pluckable shoots, the maintenance foliage is required to cater to the metabolic needs of other plant organs and put aside sufficient reserves to see the bush through the leafless period after pruning. Health and productivity of a tea bush, therefore, depends on the size and efficiency of the maintenance leaf canopy.

The maximum life-span of a tea leaf on a tipped primary is about 18 months. Peak photosynthetic efficiency of a leaf lasts for about six months after full expansion.

The top layer of maintenance foliage makes the maximum contribution towards the growth of new shoots. Photosynthesis declines from the top to the bottom layers of maintenance foliage due to obstruction in the passage of light through the canopy. The contribution made by the lower layers of maintenance foliage to the carbohydrate pool of the tea bush is accordingly reduced.

Maintenance foliage : crop ratio

Production efficiency could be gauged by determining the ratio between crop harvested during the preceding 12 months period and weight of maintenance foliage in the top 20 cm zone of the bush. A ratio of 2.0 + 0.2 has been found to be optimal. For direct application in the field, this ratio could be translated into simple practical terms as the depth of effective maintenance foliage (top hamper) from the plucking surface ranging from 20 to 25 cm, to approximate the optimum ratio indicated above. Such a measure will also be an index to the state of health and productivity of the bush.

SOURCE AND SINK

The canopy of maintenance foliage is the 'source' of carbohydrates and the proliferating and expanding organs of the plant are the 'sinks' or the sites for their utilisation. Products of photosynthesis move from the source to sinks. Radiotracer studies have shown that the successive crops of shoots

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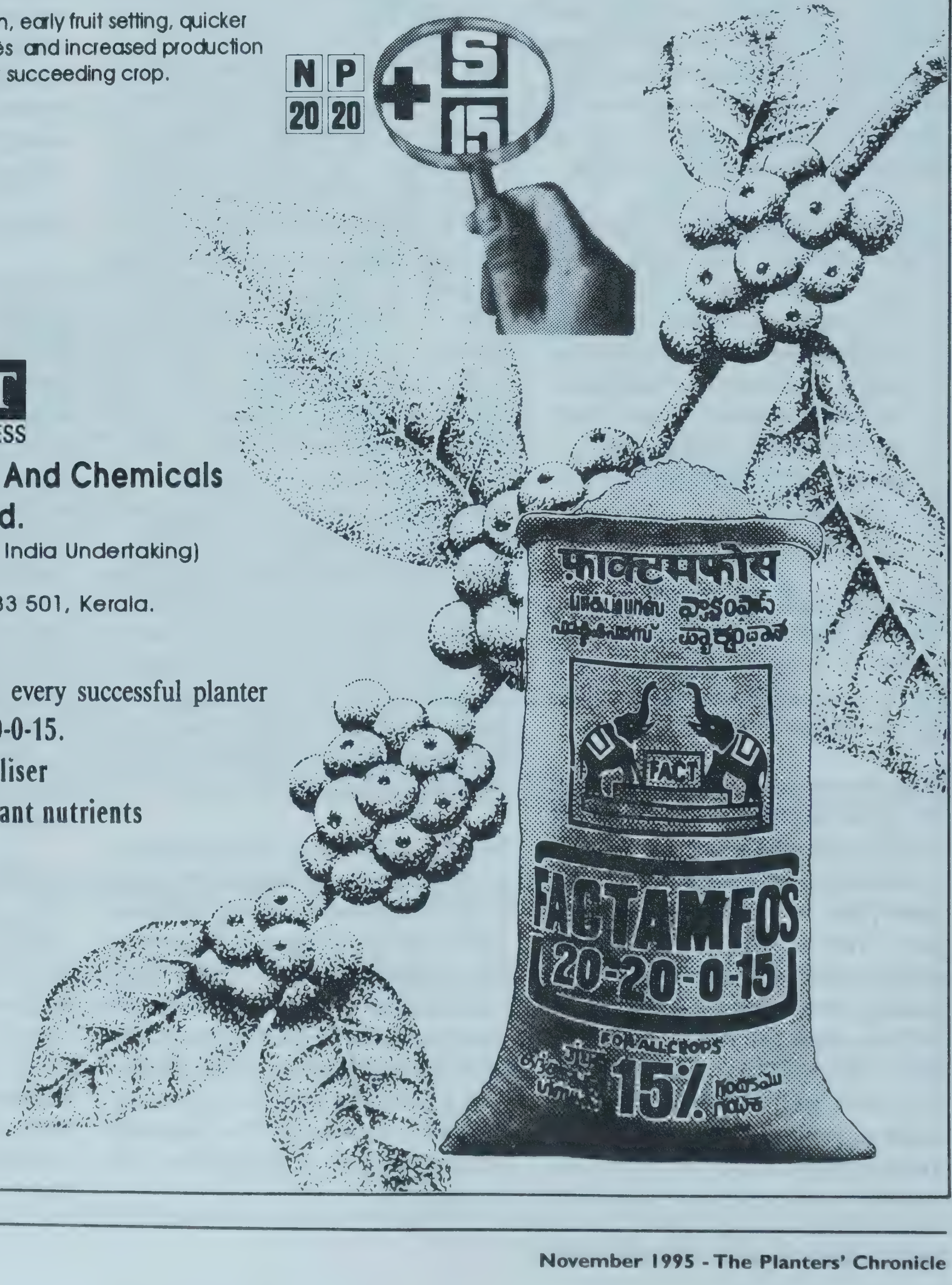

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developing at the plucking table are the strongest sinks on a plucked tea bush.

Carbohydrates produced by all the leaves of a maintenance canopy are primarily mobilised for the growth of shoots. If the top layers of the maintenance foliage produces enough carbohydrates to satisfy the demand of the growing shoots, then the photosynthetates produced by the lower layers of foliage are spared to move downwards to the roots.

GROWTH AND DEVELOPMENT

Plucking systems have profound effect on shoot multiplication.

In mother leaf plucking, the stub of every plucked shoot carries usually three to four dormant buds, each one of which is capable of developing into a crop shoot. Out of these, only the bud in the axil of the foliage leaf just below the point of plucking develops into a pluckable shoot; the other dormant buds do not usually produce any growth. This means that less than 30 per cent of the buds at the plucking table are stimulated into shoot production under mother leaf system of plucking.

When plucking is done to the fish leaf (thumb leaf) the stub carries three/four dormant buds out of which the bud in the axil of the topmost fish leaf and, in addition, some buds in the axils of Janam/ scales below the fish leaf develop into crop shoots. Plucking system, while determining severity of the operation, also determines the amount of mature foliage that is left behind on the bush.

Variations in the rate of shoot growth and development from the axils of scale leaf, fish leaf and mother leaf of tea plant in relation to plucking has been studied. The data could broadly be summarised as follows :

1. After plucking a shoot, no visible development occurred in the axil for about 30 days. Unfolding of scale leaf generally occurred between 34th and 40th day.
2. Axillary bud of mother leaf took less time to grow into a pluckable shoot than either that of the fish leaf or scale leaf; there was a time lag of 10 to 12 days between lean and growing periods under each system of plucking.
3. Weight and length of shoots developing from the axil of mother leaf were greater than those in the axil of fish/scale leaf.

PLUCKING Vs. SHOOT GROWTH

Plucking system is the severity of plucking. In a healthy bush, normally, an axillary bud produces five to seven leaves, including the scales before it turns banji. As the bush advances in stage, since the carbohydrate supply cannot cope with the rate of expansion of shoots, the shoots may turn banji after producing only one or two leaves.

Under continual mother leaf plucking insufficiency of assimilates does not appear to be the factor limiting shoot multiplication. In this system, the stimulus of plucking does not extend below the leaf over which the shoot is plucked. As a result generally only one shoot grows out of each stub.

Technically, optimal severity of plucking would be to a fish leaf because its axillary bud is in the state of maturity and given a stimulus this is the one which produces shoot faster. About six/ seven generations of shoots are produced per year under continual fish leaf plucking. Mother leaf plucking, results in about five generations of shoots.

In view of these facts, the most productive system appears to be to pluck to the fish leaf. Continual fish leaf plucking, however, will be unable to meet the carbohydrate requirements of the growing buds fully because of the small size of fish leaf that is retained on the bush and consequent constraint on the maintenance leaf area. As a result, size of shoots decline faster. Moreover, continuous fish leaf plucking promotes fast creep in the height of the bush and makes the bush unmanageable even in the third year itself. This system of plucking thus, has limitation for commercial application.

Plucking to janam will result in their axillary buds taking a long time to grow owing to the few initials contained in them. Inadequate supply of assimilates to the growing buds due to the reduced maintenance foliage will become a limiting factor, in due course. Such a system of hard plucking, is perhaps, justified in areas where cropping is very seasonal due to the marked climatic changes and, if the

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cropping period is preceded by 'dormant' one, as in N.E. India.

A harmonious blend or an integration of different systems of plucking is necessary to ensure a continued supply of carbohydrates to the growing shoots and at the same time replenish the bush of its depleted starch reserves. Such an integrated system of plucking is being recommended by the UPASI Scientific Department. *In this schedule, level plucking, irrespective of the severity, is recommended from April to December and step up plucking in January, February and March.*

EFFECT OF SHADE

In Kenya, yield of crop shoots dropped as the percentage of bushes receiving shade from *Grevillea* increased. In Malawi, shade trees depressed yield and reduced the efficiency of applied nitrogen. These observations promoted such questions as : is shade really necessary for tea? If so, under what conditions? These and allied questions led to undertake a series of basic and field investigations.

Observations made under wide range of environmental conditions in N.E. India showed that on bright days in summer when the dry bulb temperature rose to 30°C-32°C, temperature of tea leaves fully exposed to the sun reached 40 to 45°C. Flat or horizontal leaves were 2°C to 4°C warmer than erect leaves. Shading caused leaf temperature to remain within ± 2°C of the ambient. Since leaf temperature above 30°C is harmful for photosynthesis by tea leaves, shade enhances dry matter production by keeping the leaves cooler on hot days in places where temperature of exposed leaves rises above 30°C.

Shade trees intercept both infra red and visible radiations of sunlight reducing thereby the incidence of not only heat but light energy on the tea bushes. Results of further investigations lead to the conclusion that thickness or thinness of the maintenance leaf canopy determines the reactions of tea bushes to shade.

When the canopy of maintenance foliage is thin, sunlight reaches the lower leaves in the canopy and cause overheating. Hence, in the absence of a shade, entire photosynthetic system of weak bushes suffers from the adverse effects of high temperature.

In vigorous tea bushes carrying superfluous maintenance foliage, the lower leaves do not get enough light. As a consequence, their photosynthetic efficiency is reduced.

Shade has also been reported to interfer with mineral nutrition. Response of tea bushes to nitrogen and other nutrients depends on the size of the maintenance foliage. when the canopy of maintenance foliage is not optimal, carbohydrate synthesis falls and fertilisers become less effective. Thus, it is the maintenance foliage which indirectly determines the response of plucked tea bushes to shade.

PRUNING Vs. SHOOT GROWTH

Pruning reduces the leaf area drastically, thereby curtailing the photosynthetic ability of the bush. The number of growing points is reduced and the balance between the growth of shoots and roots disturbed. The bush could be assited in its recovery by imposing a pruning of as low a severity as possible, subject of course, to the necessity of maintaining the requisite shape and revitalising its vegetative vigour. Repeated hard pruning in successive cycles is neither necessary nor beneficial, if the primary wood is healthy.

Cut across as opposed to pruning helps the bushes to recover faster and contribute more to crop in the first year. Bushes cut across leaving behind certain amount of foliage recover and come to tipping in eight to twelve weeks; the lighter this form of pruning, the earlier the recovery is.

Carbohydrates in roots are important for recovery of bush from pruning. Regeneration of pruned bush is solely supported by the carbohydrate reserves in stems and roots. So, it is imperative to prune the bush at a time when the carbohydrate assimilates are at optimal levels. When the carbohydrate reserve is poor, it is desirable to leave a lung comprising about 300 leaves. The lung should be removed at the time of tipping, to tipping height, but not to the pruning height.

Both the above pre-requisites for pruning are fulfilled in the two periods, April/May and August that are recommeded for pruning in South India.

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SCHEDULING OF FERMENTING DRUMS

P. RAMAKRISHNA*

Fermentation is the most important operation in the manufacture of Black Tea as the quality of the tea depends on the conditions of fermentation. Fermentation of the rolled or CTC cut leaf on the floor is the oldest method[1, 2] and used even now in some factories. This operation underwent radical changes with changing times. In the modern manufacturing methods, continuous fermenting machines are becoming popular day by day as the various parameters like air volume, RH of the air, fermenting time etc. can be precisely controlled to get desired fermentation.

The concept of using rotary drums[3] for fermentation was first conceived by M/s. A.C.K. Krishnaswamy and C. Hariprasad, the then partners of M/s. Walker & Greig Company in 1968. These drums became very popular in South India for fermentation of tea because they facilitate granulation and increase the bulk density which is desirable for South Indian CTC teas.

The number of drums required in a factory and their operating schedule have a direct bearing on the capacity utilisation of the factory. However, not much literature is available on the subject. This article describes clearly how to calculate the number of drums and operation schedule to get a maximum capacity utilisation.

HISTORY OF DRUMS

The original design first made was a twin horizontal rotary drums to handle about 750 to 1000 kg/hr of CTC output. Continuous operation, reduction in labour, improved hygiene and less floor space are the important advantages claimed.

Later, single horizontal drums of various sizes ranging from 4-6' dia., 20-24' length with and without pedastals were fabricated by Walker & Greig depending upon the individual requirements of the factories.

The following improvements were made in 1983 based on the guidance of UPASI Tea Research Institute :

1. One end of the drum was made conical for better air retention thereby facilitating better oxidation of teas.
2. The pitch of the spiral inside the drum was halved and two spirals were provided instead of a single spiral in the original drums to help the dhool forward without intermingling of fermented and unfermented tea dhools.
3. The RPM was also reduced to one for better oxidation.

Recently, flights were introduced[4] into the drums to carry the dhool to some height so that during the drop the tea dhools get evenly exposed to oxygen to improve the quality of the tea.

While some of the factories use the drums continuously, most of the factories use the drums in a batch manner to suit their fermentation time and capacity of the factory. In such cases, scheduling is very important to get optimum utilisation and consistency in quality.

SCHEDULING OF DRUMS

Calculation of No. of Drums :

The number of drums required for fermentation depends on the capacity of the factory, maximum fermentation time and capacity of the drum.

No. of CTC Batteries = n
Cutting rate in each battery = w kg/hr
Total cutting rate of withered leaf = nw = W Kg/Hr
Capacity of the drum = C Kg
Maximum fermentation time = ^{T}Max

---

* R & D Department, Tata Tea Limited, Munnar - 685 612.

Amount of cut withered leaf to be held in drums = $W \times T\,Max$

Minimum Number of drums $= \dfrac{W \times T\,Max}{C}$

In actual practice one extra drum is required for loading and unloading.

Actual number of drums $= \dfrac{W \times T\,Max}{C} + 1$

Thus the number of drums required for a 1, 2, 3 battery factory with cutting rate of 800 kg/hr withered leaf for each battery and a maximum fermentation time of 60 minutes when the drum capacity is 400 kgs are 3, 5, 7 respectively.

SCHEDULING OF DRUMS

Fermentation time varies from season to season depending upon the leaf and weather conditions. Operating schedules of drums depend mainly on the fermentation time. The maximum capacity utilisation is possible only when the cutting rate of withered leaf or feeding rate to the drum is matched with the discharging rate from the fermenters.

Operation of the drums has to be scheduled accordingly to get maximum capacity utilisation. To get this, the loading time for the drums has to be calculated based on the fermentation time and number of drums available. Also to get uniform feed rate to the drier, the discharging rate and feed rate to the drum must be equal.

Loading time =
Discharge time = X Hrs
Fermentation time = T Hrs
No. of Drums = N
For optimum capacity utilisation,

$$\frac{T + X}{N} = X$$

$$\text{or } T = X\,(N-1)$$

$$\text{or } X = \frac{T}{N-1}$$

Thus, loading time = fermentation time ÷ (No. of Drums – 1).

The amount of Dhool to be loaded to each drum varies depending upon the loading time. The relation between loading time, fermentation time, load to each drum and number of drums for different cutting rates are shown in Table - 1.

CONCLUSIONS :

Scheduling of drum fermenters, especially when they are used as batch units, is very important to get maximum capacity utilisation in any factory. While number of drums required depends on the capacity of the factory, maximum fermentation time and maximum capacity of the drums, loading times to the drums and operation of the drums have to be scheduled with changes in fermentation time due to changes in leaf and weather conditions.

ACKNOWLEDGEMENT :

Thanks are due to Mr. H. Prasanna of M/s. Walker and Greig for the information on the history of Drums.

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TABLE - 1 :

No. of CTC Battery	No. of Drums	Fermentation Time Min.	Loading Time Min. Sec	Load in the Drum in KG	
				Cutting rate KG WL/Hr	
				700 Kg/Hr	800 Kg/Hr
1	3	40	20.00	233.33	266.67
		45	22.30	262.50	300.00
		50	25.00	291.67	333.33
		55	27.30	320.84	366.67
		60	30.00	350.00	400.00
		65	32.50	379.16	433.33
		70	35.00	408.34	466.67
		75	37.30	437.50	500.00
		80	40.00	466.67	533.33

(Contd.)

No. of CTC Battery	No. of Drums	Fermentation Time Min.	Loading Time Min. Sec	Load in the Drum in KG	
				Cutting rate KG WL/Hr	
				700 Kg/Hr	800 Kg/Hr
2	5	40	10.00	233.33	266.67
		45	11.15	262.50	300.00
		50	12.30	291.67	333.33
		55	13.45	320.84	366.67
		60	15.00	350.00	400.00
		65	16.15	379.16	433.33
		70	17.30	408.34	466.67
		75	18.45	437.50	500.00
		80	20.00	466.67	533.33
3	7	40	6.40	233.33	266.67
		45	7.30	262.50	300.00
		50	8.20	291.50	333.30
		55	9.10	320.84	366.67
		60	10.00	350.00	400.00
		65	10.50	379.16	433.33
		70	11.40	408.34	466.67
		75	12.30	437.50	500.00
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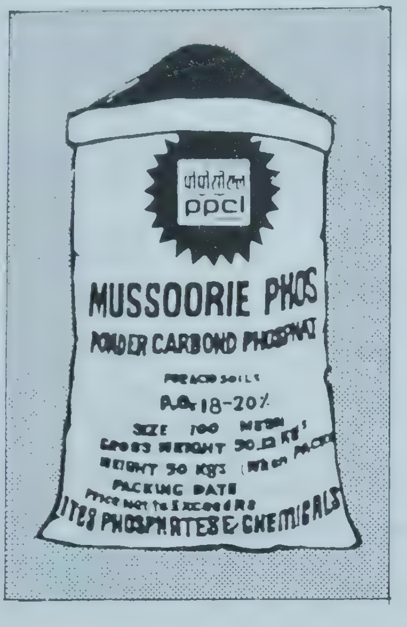
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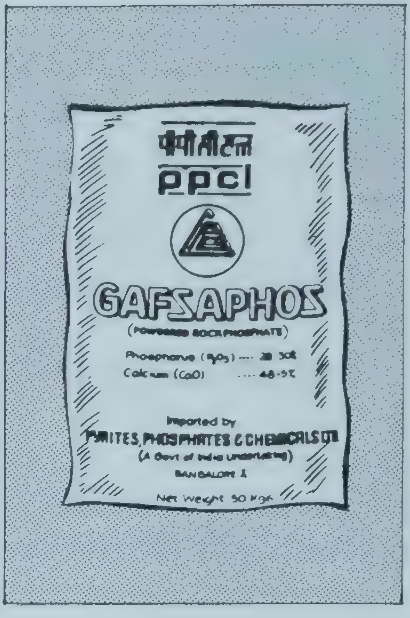
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K.A. JOHN VICTOR

KDPA : High Tax Incidence

The main problem the plantation industry facing today is high tax incidence. After paying income tax of 46 per cent on 40 per cent of the industry's income, as much as 65 per cent is charged by state Governments on the remaining 60 per cent leaving nothing for the industry to reinvest in improved cultural practices or on increasing production and productivity, even in a good year. Last year when we assembled here, the tea market did not present a cheerful scene. This year the prices have picked up following international and domestic demand and with the Tea Board's role being clearly defined, the industry expects it to grow stronger. However, according to experts, a storm is brewing in the Indian tea industry, with exports down and a large number of common varieties bringing the prices down. Market experts have suggested launch of a quality 'India' Tea to regain its place in the world tea market to counter competition from traditional rivals and new entrants.

The export scenario for the current year appears especially grim with prospects of a low production due to unfavourable weather conditions especially in the North India. The seriousness of the issue will be clear if one realises that all India tea production in the first 8 months of this year is 426 million kgs, down by 40 million kgs from 466 million kgs in the same period last year. At the same time production in Kenya is way ahead by 26 million kgs and in the absence of any domestic market it is able to dump teas at very low prices. As a result, Indian teas are getting out priced in world market.

Land being limited, chances of bringing in additional land under tea cultivation is difficult. Therefore, the suggestion by the Director of Tea Board (Research) Dr. K. Choudhri at the 102nd UPASI Annual Conference requires serious consideration. Indian tea production which is likely to be about 100 million kgs less than the demand by the turn of century could be increased by over 450 million kgs, if potential yield gap in the existing cultivation area of Assam/West Bengal and South India are tapped. According to him the likely production by 2000 AD will be only 910 million kgs, going by the current production figures against the target of 1000 million kgs. While domestic demand had registered a compound growth of 5.03 per cent, the production had increased by 2.46 per cent only.

The Union Commerce Minister has rightly pointed out the need to increase our productivity to 1850 kgs per hectare from 1750 kgs and bring more areas under tea cultivation in order to reach the production target of 1000 million kgs set for year 2000 AD. He has exhorted the planters to ensure that production keeps pace with consumption failing which there will not be a surplus for exports. There was an urgent need to find new export markets for tea, particularly niche market. This, we are all aware, is a clear lesson we learned from depending too much on a single market namely CIS. In this connection, it is gratifying to note that the demand for quality tea especially from Darjeeling and Assam is growing. The Indian tea industry has stepped up its effort to get protection under the trade related intellectual property rights clause of the world trade organisation.

On the crop front the district is doing fairly well, with level of production being better than that of 1993-94 and we hope that this trend will continue. Weather has been good this year and we are lucky not to get a severe south west monsoon. Prices although remained depressed during the early part of the year, have now moved to higher level, which is a very encouraging trend.

While majority of the gardens have come forward for large scale renovation and capital investment in buildings etc. it is most disappointing to note that the building contractors' union is using pressurising tactics to get unreasonable wage hike forgetting all the fringe benefits they and their artisans are enjoying. In fact they are trying to make the hay while the sun shines – exploiting the construction boom in and around Munnar – on a short-term benefit basis – I appeal to them to see reason and not to deprive the labour of the benefits passed on by corporate sector.

– Excerpts from the Chairman's speech at the 107th AGM of the Kanan Devan Planters' Association held in Munnar on 23rd September 1995.

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M.R. BHIMAN

CTTA : Emphasis on Quality Tea*

During the year 1994 the quantities sold in this Centre remained around the same figure as 1993 namely 41.2 m.kgs. The increase in the offerings has been mainly during the current year i.e., 1995. Although the South Indian tea crop is expected to be around the last year figure, the offerings in Coonoor upto end October this year spurted to 43 million kgs. which is nearly 10 millions above the same period last year. The average price realised upto Sale No. 43 is Rs. 39.09 per kilo against last year's Rs. 27.33 for the same period.

Prices of the teas on offer have been quite remunerative for the producers this year and, the small growers in particular, have benefited considerably. The situation at the moment is quite different from that prevailed when we met here last year for the 27th AGM.

On the warehousing front, I am sorry to say that we are struggling to accommodate the great increase in the offerings in whatever storage spaces available. Warehousers find it extremely difficult to find new warehusing space and the current rule in the Nilgiris for the construction of new buildings is an impediment for making any progress in this respect. We would request the Collector of Nilgiris to allot, some suitable land for construction of warehouses, so that the waehouses can be centralised and the possible disturbance by the lorries to the traffic in the town can be avoided. Cost of warehousing has also increased as in the case of cost of everything else in the country. Warehousing charges have been enhanced to Rs. 18/- per quintal.

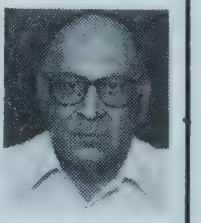
Export buyer-members have experienced great difficulties at the salestax check posts. We made representations to the Chief Regional Executive of the Tea Board, and I am happy to say that with his assistance we have been able to get the Commercial Tax Authorities to streamline the procedure, the documents required for the transport of teas etc. With the larger number of buyers operating in this auction centre, it became necessary for us to increase the quantum of pre auction sample to be drawn from each lot to 2.8 kg from 2.5 kg hitherto.

Our progress during the last one year was not only in the quantities on offer and the remunerative price, I am proud to say that there has been considerable improvement in the quality of the offerings. I wish to place on record the services rendered by the Adjudication Committee who have been keeping a close watch on the standard of the offerings, and suitable action taken to see that there is no room for complaint in this respect. The District Authorities, the Tea Board

PERSONALIA

KPA OFFICE-BEARERS

Mr. Shireesh Gurjer has been elected Chairman of the Karnataka Planters' Association (KPA) for the year 1995-96.



Mr. S.A. Mohsin was elected Vice-Chairman.

The other members of the Executive Committee are : Messrs. N. Bose Mandanna, V.P. Krishnan, B.K. Muthanna, M.M. Muthanna, SP. Muthuraman, C.N. Nataraj and Peter Mathias.

KDPA CHAIRMAN

Mr. K.N. Chengappa has been elected Chairman of Kanan Devan Planters' Association (KDPA) for the year 1995-96. Mr. J.S. Grewal was elected Honorary Secretary.

The other members of the Committee are : Messrs. P.G. Prakash Shanker, P.D. Suresh Kumar, P.G. Parameswaran, B.M. Sharad, M.N. Appaya, Manjit Singh, V. Sivaramakrishnan, S. Mukherjee, N.M. Uthappa, K.A. Neelakantan and D. Victor.

CTTA OFFICER-BEARERS

Mr. Hemant J. Shah has been elected Chairman of the Coonoor Tea Trade Association for 1995-96

Mr. T. Rangaiah was elected Vice-Chairman.
The other members of the Committee are : Messrs. M.R. Bhiman, J. Hutchi Gowder, I.C. Warne, M. Hiriyan, R.B. Gopalakrishnan, S. Kkaleel Ahamed, Dhirendra K. Dani, Jaduram Agarwal, O.R.M. Prabhu, Salim David, AshokVkharia, M.A. Chacko, Philip John and S.N. Raju.

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and the small growers in the tea growing areas have also done their part in maintaining the quality and to prevent any spurious material coming into the district.

The difficulties experienced by export buyers at Salestax check-post are very real and can affect export buying. We had made representation with the Sales Tax Commissioner in this matter and the matter is sorted out for the time being. It seems that there is a move to remove the six months facilities i.e., to buy without order and shipping within six months. If this facility is cancelled, there will be real difficulty to move the teas purchased for export, even to exporters godowns from the warehouse, as every lorry will have to accompany prior order and exporters bill of the foreign buyer.

Address by the Chief Guest Mr. Vivek Harinarain, IAS, Chief Regional Executive, Tea Board, Coonoor. Excerpts :

There are various factors for the prevailing improvement on the price front. Firstly the lower production at North followed by the improvement in export enquiries. Also, the quality of tea being offered at the auctions, particularly at this Centre, has been improved susbtantially. However, more definite action is needed in this direction. There is a general feeling among the public and others that large scale substandard teas are being produced, especially in the Nilgiris. This, I am sure, you all will agree is an unnecessary allegation. A series of action has been taken to prevent the damage to the reputation of the Nilgiri teas. The State Authorities and the Tea Board has taken some positive steps. Tea Board's Coonoor office has taken a series of meetings with the Brokers, producers and others and issued various appeals to the producers, to improve the quality. The brokers, the buyers and others have been asked to bring to the notice of the Board as and when they come across any sub-standard teas being offered for sale in the auction or at any other place. We are also taking steps to stop bringing in the RC materials and other sub-standard teas into the Nilgiris. I would appeal for the co-operation of all of you to improve the quality of tea produced and sold in the Nilgiris. We, in Tea Board, will continue to legally take all possible action to ensure that the quality of manufactured tea is maintained.

At various forums in the recent past, I have also mentioned the measures that were taken by the Government and the Tea Board in simplifying the procedures as part of liberalisation process. The Tea Board has dispensed with the requirement of registration of export contracts. Secondly, the registration of tea packets meant for export with the Tea Board was done away with except for the tea packets which carry the Tea Board's marketing symbol and the three logos of Darjeeling, Assam and the Nilgiris. Thirdly, with effect from June, 1995, all tea exporters were exempt from the need for obtaining shipment licences from the Tea Board and further the validity of the exporters' licence has now been made permanent except for those who would be applying for new exporters' licence in which case also, instead of the earlier practice of giving licence for one year, it will now be given for 3 years and on completion of 3 years of good track of export, the licence will be made permanent.

From a study made by the Research & Development Department of the Tea Board, it is revealed that if we bring all tea estates to the potential yield level i.e., those below the district average to the highest yield achieved in the same district as much as 450 m.kgs. of additional teas could be produced from the 4.25 lakhs hectares under tea available in India. With our current targetted production of 750 m.kgs. or so, can we not try grab at least 200/250 m.kgs. of the projected 450 m.kgs? This would require tremendous developmental efforts.

At a recent meeting with the Planning Commission and the Ministry of Commerce, we have done an exercise of trying to locate the funding requirement and the sources for this level of mammoth exercise. The fund required would be over Rs. 2,000 crores and a large percentage of this would have to come from the internal generation of funds from within the industry itself. The Tea Board and the Government of India is actively considering to enhance the scale of development assistance to the tea industry and very soon you can expect a favourable announcement in this regard.

---

* **Excerpts from the Chairman's address at the 28th AGM of the Coonoor Tea Trade Association held on 24th November 1995.**

UPASI UPDATE

(CONTAINING DEVELOPMENTS DURING OCTOBER 1995)

COMMITTEE MEETINGS

- ☆ Executive Committee Meeting : Coonoor : 6.10.1995
- ☆ Trustees : Coonoor : 6.10.1995.

VISIT OF PARLIAMENTARY TEAM

The Parliamentary Standing Committee of the Union Ministry of Agriculture visited UPASI-KVK in October 1995. The Committee's primary objective was to evaluate the impact and work performance of India's KVKs. The Committee along with ICAR officials, visited UPASI-KVK campus, Mini Tea Factory and Instructional Farm. A meeting with the Committee was chaired by Mr. R.D. Vadera, UPASI Vice President. The discussions centered around the functioning of UPASI, impact of KVK work, tribal development, labour relation and women development. The Committee appreciated the work of UPASI-KVK in the area of rural poverty alleviation and overall development activities within the district.

INDIA BLEND PROJECT

As members are aware, the Consultative Committee of Plantation Associations (CCPA) has visualised the concept of the above project towards promoting tea shipments, to start with, to Russia. A series of meetings have been held on the project proposal as well as the modus operandi. The project is to be initiated shortly and, in the first phase, Assam Orthodox broken blend will be shipped in consumer packages of 100 gms/ 250 gms. Subsequently, it is envisaged that South India Orthodox blend consisting of certain selected grades would be taken up for export under the scheme. A status paper on the subject has been circulated to all tea estate members.

TEA WORKSHOP

The Indian Tea Association, along with the Indian Institute of Plantation Management, organised an Interactive Brainstorming Workshop on Tea on October 12/13 in Calcutta. The themes were : Production Strategy for 21st Century, Strategies for Domestic Marketing, Challenges in International Marketing and the Scenario of Indian Tea Industry by 2005. Dr. V.G. Dhanakumar, Principal and Chief Training Organiser of UPASI-KVK presented a paper on Technological Upgradation in Tea towards 2005 and beyond with reference to Quality Management.

WORLD BANK PROJECT FOR RUBBER

The UPASI has signed a Memorandum of Understanding with Rubber Board, under which a World Bank grant of Rs. 20.07 lakhs is being provided through Rubber Board to the UPASI Rubber R & D Centre at Kottayam. Initially, the project is for a three-year period up to June 1998. The R & D Centre will establish soil and foliar diagnostic facility at Kottayam towards servicing the rubber growers. The samples of soil and leaf received from the growers will be tested and necessary recommendation will be made for discriminatory fertiliser application.

PROJECT ON NUTRITION

The ICAR has sanctioned a Project on Nutrition to be undertaken by UPASI-KVK. The total grant for the implementation of Nutritional Project will be 7 lakhs. The project focusses on socio-economic, nutritional and dietary practices of the tribals with special reference to the children, pregnant and lactating mothers. Low-cost nutritious supplementary feeding along with nutrition education will also be taken up. The expected outcome of the study will be improvement in Nutritional Status, Dietary Practices and Knowledge on Nutrition.

INDUSTRIAL COMMITTEE ON PLANTATIONS

The Tripartite Industrial Committee on Plantations met on 20th October 1995 in New Delhi under the Chairmanship of Mr. G. Venkataswamy, Union Labour Minister. The meeting was specially convened to discuss and finalise certain changes to the Plantations Labour (Amendment) Bill and to replace the present Bill with a new Bill incorporating such changes. The changes finalised in brief are :

— **Safety Provisions :** Under the proposed safety provisions on use of chemicals, etc., the employer can 'designate' an existing employee possessing necessary qualifications to supervise the work, instead of 'appointing' a person.

— **Prohibition of employment of Child Labour :** Employment of children below the age of 14 years will be prohibited.

— **Cognisance of offence :** A Union will have the right to make a complaint to the Chief Inspector of Plantations about violation of any provisions of the Act by the employer and the Chief Inspector, in turn, will ask the employer to rectify the defect within 90 days. After the expiry of 90 days, if remedial measures are not taken by the employer, the Union will have the right to approach the Court direct.

— **Medical Facilities :** The Plantations Labour Act will make provision for the following scale of medical facilities :

i)	Every Plantation irrespective of size	:	First-aid box.
ii)	Every Plantation employing more than 50 but less than 750 workers	:	Own dispensary with a combined Garden Hospital for a number of such Plantations.
iii)	Every Plantation employing 750 or more workers	:	Own Garden Hospital
iv)	Every Plantation employing more than 10,000 workers.	:	Own Group Hospital.

THE WORKMEN'S COMPENSATION (AMENDMENT) ACT, 1995

The above Amendment Act bringing major changes to the Workmen's Compensation Act, 1923 has been brought into force on 15th September 1995. The amendments include raising the compensation substantially both for death and permanent total disablement resulting from employment injury; raising the qualifying wage limit for purpose of calculation of compensation from Rs. 1,000/- to Rs. 2,000/- p.m., provision for meeting the funeral expenses of the deceased workman of Rs. 1,000/- by the employer, raising the interest from 6 to 12 per cent in the event of the employer defaulting in the payment of the compensation; additional insertions in the Schedule listing occupational diseases, etc.

THE PAYMENT OF BONUS (AMENDMENT) ACT, 1995

The above Amendment Act repealing the Bonus Ordinance promulgated on 9th July 1995 raising the salary limit for coverage as well as for computation of bonus has been adopted by both Houses of Parliament and also received the assent of the President on 30th August 1995. The Amendment Act carries the same provisions as in the Ordinance, which is deemed to have come into force on the 1st of April 1993. Meanwhile, some employers have challenged the retrospective operation of the amended provisions and the High Courts of Madras, Rajasthan and Punjab & Haryana have already passed stay orders.

(Note : In the Update appearing in the September issue on Page 463, the Rubber Wage in Tamil Nadu may be corrected as Rs. 56.90 instead of Rs. 57.05.)

PERSONALIA : 1995-96

	Chairman	Vice-Chairman
Planters' Assn. of Tamil Nadu	**Mr. P.S. Wallia**	**Mr. P.S. Ponnapa**
Nilgiri Planters' Association	**Dr. D. Hegde**	**Mr. T. Jayaram**
Kanan Devan Planters' Association	**Mr. K.N. Chengappa**	
Anamallai Planters' Association	**Mr. N. Dharmaraj**	
Cardamom Planters' Association	**Mr. C. Rajagopal** *(President)*	**Mr. S.M. Ramasubramanian** *(Vice President)*

UPASI Update

PRICE TREND (Rs./Kg.)

CROPS	LATEST		6 MONTHS AGO		YEAR AGO	
TEA	C.T.C.	ORTH.	C.T.C.	ORTH.	C.T.C.	ORTH.
COCHIN	48.29	50.02	36.50	37.55	35.00	39.29
COIMBATORE	46.91	50.44	38.01	38.55	31.92	37.14
COONOOR	48.60	46.38	36.55	32.41	26.48	30.25
AVERAGE	47.81	47.20	36.64	36.95	31.08	37.26

CROPS	LATEST	6 MONTHS AGO	YEAR AGO
COFFEE			
a) ICTA Auction			
PLANTATION A	82.76	118.49	122.00
ARA. CHY. AB	76.76	101.37	114.92
ROB. CHY. AB	79.94	95.88	103.18
b) Coffee Board Auction			
PLANTATION A	85.67	115.56	131.75
ARA. CHY. AB	73.34	102.45	123.30
ROB. CHY. AB	78.01	96.31	109.01
RUBBER			
a) Kottayam			
RSS LOT	41.50	54.00	33.25
RSS IV	48.50	55.00	34.00
b) Kuala Lumpur			
RSS 1	38.84	55.28	42.78
SPICES			
CARDAMOM	177.58	232.34	291.57
PEPPER	80.00	84.50	77.00
CLOVES	100.00	80.00	95.00
NUTMEG	83.00	95.00	99.00

TEA CROP - SOUTH INDIA - (TONNES)

SEPTEMBER

1995 : 14,267
1994 : 15,307
1993 : 16,484

JANUARY to SEPTEMBER

1995 : 132,022
1994 : 137,520
1993 : 128,055

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Monocrotophos 36%,
Phosphamidon 85%,
Ethion, etc..etc...

WEEDICIDES : **Gramoxone 2, 4-D, etc.**

FUNGICIDES : **Nickel Chloride,**
Copper-Oxy Chloride etc.

GENERAL : **Aluminium Sulphate,**
Magnesium Sulphate,
Manganese Sulphate,
Zinc Sulphate, etc.

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CHEERFUL NEWS ON THE NR FRONT

On a resurgence of strong consumer demand, NR prices in the international market are expected to remain firm at the current levels or may even go up to higher levels. The wet spell in Malaysia affecting tapping coupled with strong demand had led to the above assessment.

The above news is indeed a welcome one for the NR producers in India. Prices of rubber had remained at attractive levels during the last over a year. The statement of the Commerce Minister that so long as the Indian prices maintain parity with international prices or even if the Indian prices are slightly higher than the international prices, when read with the international scenario on rubber indicated above, is not only an assurance for attractive prices in Natural Rubber in the times to come but also that the Government would not frown upon such a price level. Buoyancy in the rubber consuming industry in the country would ensure that there is no lowering of demand.

The attractive rubber prices ruling in the country during the last one year should be taken as correction of the lopsided Bench Mark Price fixed by Government sometime back, which had not fully taken into account the cost of production, the land price and reasonable profit.

There is yet another welcome side in regard to NR production and that is the increasing importance attached by the growers in the use of rubberwood for manufacture of furniture. There is good scope of increasing this activity. In fact, there was a report sometime back to the effect that NR growers in Malaysia are now tending to look at the rubberwood as the main product and latex as secondary. With suitable promotion efforts, use of furniture made from rubberwood should be increased. There is also good prospect for export of rubberwood.

The UPASI R & D Centre for Rubber, Kottayam, has been involved in the development of rubberwood as raw material for furniture. It is gratifying to note that the efforts of the R & D Centre has led to increasingly growers taking interest on better use of rubberwood. Yet, the efforts made by the Centre have only led to catching the attention of a small percentage of growers. It is necessary that better use of rubberwood is propagated more widely among the rubber growers.

The good work that has been done by the UPASI R & D Centre for Rubber in Kottayam has come in for recognition of the Rubber Board and the World Bank. Out of the World Bank aid given to the Rubber Board, the latter has given a grant for Rs. 20 lakhs to the UPASI R & D Centre for undertaking soil and leaf testing. The project is expected to start shortly. The project period is up to June 1998. The World Bank assisted project would enable the R & D Centre to do more testing of soil and leaf. In turn, the growers could take advantage of the testing facilities which would lead to improved methods of rubber cultivation.

While making the statement on parity on Indian and International prices of rubber, the Commerce Minister made a scathing attack on the rubber dealers alleging that it is hoarding by them that had led to the price spiral. The Minister also exhorted that the role of middlemen should be minimised in rubber trade. When the country is moving to market oriented economy, there is a legitimate place for the dealers. In fact, in market oriented economy the role of dealers is more vital. They have to often function as credit agencies, stock holders for growers and consumers, etc. On the price front, they have to take the risk of ups and downs. One has to look carefully on whether dealers hoard or hold-back. Holding back for a better price is a usual tool adopted by producers/agriculturists or those producing manufacturing items. Further in a State like Kerala, where literacy level is high, it is difficult to assume that the growers will be unaware of the market price trend and that the dealers are hoodwinking the growers.

UPASI OFFICE HOLIDAYS - 1996

In addition to all Sundays, the following shall be the holidays for UPASI Office during the year 1996.

1st	January	1996	Monday	New Year's Day
15th	January	1996	Monday	Pongal
26th	January	1996	Friday	Republic Day
21st	February	1996	Wednesday	Ramzan
5th	April	1996	Friday	Good Friday
13th	April	1996	Saturday	Tamil New Year's Day
1st	May	1996	Wednesday	May Day
15th	August	1996	Thursday	Independence Day
4th	September	1996	Wednesday	Janmashtami
16th	September	1996	Monday	Vinayaka Chathurthi
2nd	October	1996	Wednesday	Gandhi Jayanthi
25th	December	1996	Wednesday	Christmas

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EDITOR : D. Ravindran. Printed and published by Dr. D. Padmanaban at Kalaikathir Achchagm, Coimbatore - 641 037.

Opinions expressed in this journal are not necessarily those of the UPASI.

NEEM : THE PESTICIDE TREE

The potent, poison free neem is justly popular with planters and environmentalists as an effective pest control agent, but should not be seen as a panacea.

— Saleem Ahmed

Mohan Rao needs no convincing about neem's effectiveness as a pesticide. Rao, a 25-year-old farmer in South India's lush, green cardamom hills, straddling Kerala and Tamil Nadu States, learned about the special use of neem cake from his elders. "I generally use synthetic pesticides for crop protection, but for nematode control on cardamom I use neem cake," he says.

The powdery, dark brown neem cake is the residue left after the odorous oil is extracted from the seed of the neem tree (*Asadirachta indica*) native to East India. The oil goes mainly into soap, which is sold at a premium for its germicidal effects. Rao says he was taught to incorporate 200 kilograms of neem cake into each hectare of soil once a year to control the tiny nematode, which attacks roots and thereby starves the plant. "Without this I would probably lose my entire cardamom crop," he says. "And I like it because neem cake is safe, so it needs no special handling."

Rao is not alone in these sentiments. India is a leading exporter of cardamom, and the educated and affluent farmers of the cardamom hills, who produce the prized aromatic spice, buy more than 3 000 tons of neem cake annually. Because the annual rainfall of more than 1 000 millimetres makes the ground too soggy to grow the neem tree in the hills, a local pesticide dealer transports neem cake from Andhra Pradesh State, 250 kilometres away.

Vegetable and citrus growers in South and Central India also use neem cake to control soil-born pests, while poorer farmers and landless tenants mix a handful of neem leaves with wheat, rice and other grains to protect them from storage pests. Although the leaves are bitter, the relatively small quantities crumbled inside the container do not affect the taste of the grains.

Because of these and other medicinal and traditional uses – the twigs make handy toothbrushes – the handsome and hardy tropical tree towers above many mud-walled South Asian village huts, its dark green foliage providing shade and a striking contrast to the brown semi-arid landscape.

As word of neem's effectiveness as a potent but poison-free, natural pesticide has spread to other parts of the globe, so has the tree. It is now found in virtually all the tropical countries of Asia, Africa and Latin America and in northern Australia and Hawaii, and it has come under close investigation by scientists, environmentalists and policy-makers grappling with the problem of how to increase farm production in an ecologically safe manner.

WHAT'S IN A NEEM?

Of 2,400 species scientists have tested in recent years for their reported pest-control properties, neem has emerged as the most promising. According to the *Handbook of Plants with Pest-Control Properties* (M. Grainge and S. Ahmed, John Wiley, New York, 1988), which includes papers presented at five international and several regional conferences on the tree over the past 15 years :

- neem chemicals can help control more than 200 pest species, including locusts, borers, mites and termites, nematodes and scales, bugs and beetles. Testing is being carried out to verify its effectiveness against the diamondback moth (*Plutella xylostella*) and the citrus leaf miner;

- neem's pest-control properties are due to some 15 complex chemicals found in its leaves, seed, bark and roots. These are mainly *limonoids* belonging to the general class of natural products called *triterpenes*. The best-known *limonoids* found so far are *azadirachtin* (Aza), *salannin, meliantriol* and *nimbin*;

- these compounds do not kill pests outright but repel them, disrupt their growing and reproductive cycles or discourage them from feeding on treated crops. Aza, structurally similar to insect hormones called *ecdysones,* controls the process of metamorphosis as insects pass from larval through pupal to adult stages. Acting as an "*ecdysone* blocker," it prevents the adult insect from emerging from the pupa;

- neem's active ingredient concentration varies. While Aza concentration usually ranges between 2 and 4 milligrams per gram of seed kernel, up to 9 mg of Aza per gram of kernel has been reported from trees in Senegal. It is not yet clear whether these differences are due to climate or neem ecotype, but neem from North India generally contains more Aza and other active ingredients than neem from the more humid South India;

- neem compounds are environmentally safe. Studies at the Philippine-based International Rice Research Institute (IRRI) show that for reasons that are still a mystery, a neem spray that controls the brown planthopper (*Nilaparvata lugens*), a major rice pest, does not affect beneficial insects like dragonflies and spiders or fish, fogs and other acquatic life. Far from harming human health, neem may have therapeutic effects. Hindus in India eat neem leaves on New Year's Day to purify their blood, and the goddess *Mariamman Arulmiggu,* worshipped for her therapeutic powers, is known in South India as the neem goddess.

SOME CAVEATS

But Gerald Schulten, senior officer in FAO's Integrated Pest Management (IPM) Group, cautions that results of studies undertaken over the past 10 to 15 years are still inconclusive, and it would be unwise to rush into production of neem-based pesticides. For one thing, environmental conditions are unsuitable for neem in some parts of the world, and neem ecotypes could affect neem fruit/seed yield and potency.

Labour is a consideration when it comes to home-grown neem, Schulten says, because neem requires far more work than do industrially produced chemicals. Each tree yields only 5 to 30 kg a year, spread out over three or four hot and humid monsoon summer months. The trees are usually scattered around the countryside at some distance from each other, and farmers may need to apply neem more often than synthetic pesticides because neem compounds in their natural state biodegrade rapidly in sunlight, so that the effect of neem cake on the soil may last only for short periods.

In Africa, Schulten says, most farmers don't bother to collect the fruit. He would like to see Africa look to India where local, private enterpreneurs make a business of collecting and processing the neem seed and distributing its oil and other products. Thousands of small neem oil and cake producing units dot the countryside, and the rural poor earn extra pennies by scavenging the dried grape-sized fruit from underneath neem trees planted along roadways and scattered in the countryside.

Research could double or quadruple the neem seed yield, and compact neem plantings have sprung up in Belize, Guatemala, Honduras and Haiti in the caribbean, the Niger and Nigeria in West Africa and in northern Australia. But the biggest plantation to date has nothing to do with crop protection. Some 50,000 neem trees were planted over 10 square kilometres near Mecca in Saudi Arabia 12 years ago to provide shade for Muslim pilgrims during *hajj.* The plantation has a marked impact on the area's microclimate, microflora, microfauna and soil properties and could serve as a field laboratory for scientists studying neem.

Synthesis of Aza and other neem chemicals is eluding scientists and may never be realised commercially because of the complex chemical structures involved, according to Heinz Schmutterer, director of the Institute of Plant Pathology at the University of Giessen in Germany and a leading neem researcher and organiser of several international neem conferences. But two U.S. companies have patented and are now marketing pesticides based on Aza refined out of the neem "soap". Toxicity studies show the products to be environmentally safe, and the U.S. Environmental Protection Agency approved them initially for non-food crops and now for food crops as well. Sales are growing, but farmers complain that they are about twice a expensive as comparable synthetic pesticides.

Scientists are not entirely happy about these neem-based products either. Participants in an international neem conference at the East-West Center in Honolulu in 1991 warned that because the commercial products are based on only one active ingredient refined out of the neem soup, pests may develop resistance to it as they have to some synthetic pesticides. Worse, this could also trigger resistance to Aza in the natural neem soup – significantly reducing neem's natural pest control effectiveness.

The situation is more encouraging in India where the Government recently relaxed registration requirements for pesticides based on natural neem extracts. Provisional registration is issued on application, and formulators have up to two years to provide acute toxicity data. The requirement for chronic toxicity data, which takes more time and more money, is waived. As a result, about a dozen Indian companies are producing their own patented products, guaranteeing a certain percentage of enriched Aza without excluding neem's other active chemicals.

LOOKING AHEAD

Neem is an example of science learning from culture, and a model for a new generation of safe pesticides, meeting the requirements of sustainable agriculture and the interests of farming, forestry and industry. It can find a niche as a backyard pesticide tree or be exploited at a profit by small, medium and even large-scale industries. FAO might consider recommending it as part of IMP.

More research is needed not only on neem itself, but also on such issues as registration requirements for natural plant extracts, patenting and property rights and incentives to farmers and industries to use neem. But the U.S. National Research Council has already given neem its vote of confidence by publishing a book entitled *Neem : A tree for solving global problems* (National Academy Press, Washington, D.C., 1992).

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TEA : PRODUCTION TARGET AND DEMAND

by

K. VENKATACHALAM

India is a major producer and consumer of tea. The tea industry is more than 100 years old. In the last 3 years the tea industry has been going through difficult times and a solution for this is not easy to find. I shall deal with the reasons why the industry is in this state and what could be done to get out of it.

At the 113th Annual General Meeting of the Indian Tea Association, the Hon'ble Minister for Commerce Sri Chidambaram said that the tea industry has stagnated because of lack of foresight. The occasion, and the directness with which this remark was made, must have shocked the industry leaders.

LACK OF FORESIGHT

I began to wonder whether it was lack of foresight or some other reason or reasons the industry is guilty of. To me the single largest fault has been that the tea industry has been functioning as an extension of the Commerce Ministry and the Tea Board, and this 100 years old industry has not found it necessary to position itself as a partner to be consulted by the Government when taking decisions. A couple of years ago, the Government had fixed a production target of 1000 m.kgs. by the year 2000. This is a totally arbitrary target ignoring market conditions and so far I have not come across anyone telling the Government that production target will have to be linked to demand and therefore must be flexible. I am citing this as one of the many instances when the industry has not stood up and made their position clear on matters that seriously affect its fortune.

HISTORICAL FACTS

At this stage I would like to dig into some historical facts and figures to trace the events that lead to the present situation.

Political and economic situations are in continuous ferment. What was considered good for political and or economic reasons during the first two or three decades after Independence, may not be so now, because our own priorities would have changed and external factors compel rethinking. Till the late 80's Government of India considered it a national necessity to have close political and economic ties with the USSR. They took care of our defence needs, petroleum and oil products, fertilisers and capital goods for the telecommunication, power and mineral sectors. We exported a host of items and gradually the volume of exports increased substantially. The Government would sign the trade protocol and the industry would come to know of the quantity and value from press reports.

In 1950 India exported 14 m.kgs. of tea to the USSR and in 1990 the figure was 118 m.kgs. During the same period consumption within India went up by 420 m.kgs. The tea industry met the increase in domestic demand and also fulfilled the quota included in the trade protocol. Land suitable for tea cultivation was not available in plenty, and till the early 80's, profits were meagre. During this 40 year period only 100,000 hectares of new land could be brought under tea. Tea producers managed to take care of the increase in domestic demand and also keep up exports by improved agricultural practices and constant improvement and innovation in machineries.

In the 50's the yield per ha. in the North East was 987 kgs. which is now about 1700 kgs. and in the South the yield went up from 863 kgs. to a world record of 2500 kgs. There are many unsung heroes in the tea industry. In the world India has the best technology in agricultural practices and processing machinery.

PRESENT SITUATION

The present situation is that since the break up of the USSR, our exports have fallen, and going by the production trend of the last few years, the industry is unlikely to meet the production target of 1000 m.kgs. by the year 2000. It is almost four to five years since the political changes took place in the USSR and the tea industry has not found

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alternative markets. On the face of it, these are valid charges. Let us look at these to see what are the ground realities.

The Indian tea industry is more than 100 years old. The British started planting tea in India when Indonesia came under the control of the Dutch. When it was apparent that sooner or later India was going to get freedom, in order to make sure that tea supplies do not get disturbed, the British started planting tea in East Africa. These are historical facts. Admittedly the British tea interests had foresight.

The total tea production of Kenya, Uganda, Tanzania, Malawi, Zimbabwe and other African countries in 1955 was only 30 m.kgs. and in 1991 it was 332 m.kgs. In 1950 tea exports from Kenya and Malawi to the UK was only 4.7 m.kgs. and in 1990 the figure was around 101 m.kgs. Another interesting fact is that, tea bag consumption was going up in the Western world and CTC teas are ideal for tea bags because it infuses quickly and gives more number of cups per kg. of tea, compared to orthodox tea. India was and is a major producer of CTC teas, and almost 100 per cent of the East African production is CTC variety. So these countries are in direct competition with Indian tea.

SIGNIFICANT CHANGES

I have prepared a statement showing export figures for 1950 and 1990 for India, Sri Lanka and Kenya & Malawi. The figures in brackets are minus figures. The significant changes that have taken place are :

1. Exports from India and Sri Lanka to the UK, US, Canada and Australia showed substantial decrease. These are figures marked A.
2. Exports from India and Sri Lanka to the USSR increased; substantially in the case of India and a modest increase in Sri Lanka exports — figures marked B.
3. Exports from Sri Lanka to Egypt, Iraq, Iran, Pakistan, Gulf and Middle East countries showed substantial increase whereas there was only a nominal increase in Indian exports to these countries. Figures C.
4. During this period Indian exports in total increased by only 18 m.kgs. but Sri Lanka showed an increase of 80 m.kgs. Figures D. Indian producers were busy meeting the increase in domestic demand and keep up exports around 200 m.kgs.
5. Exports from Kenya and Malawi went up from 11.5 m.kgs. in 1950 to 201 m.kgs. in 1990.

One can think that it was fortunate that we got the Russian market when we lost the Western market. It was in line with national priority and the domestic demand was also met. Everyone was happy. Did this cause any side effects?

MISCONCEPTION

If anyone is under the impression that the USSR bought Indian tea in such large quantities because Indian tea is the best quality tea, it is a misconception. The trade was only for political and economic reasons. Let us leave aside the political reasons and look at the economic reasons.

The Rouble : Rupee exchange rate was artificial and Russia was getting everything at throw away price. The effect was that Russia could outbid anyone in the auction room. When hardcurrency countries were bidding, they gave bids in sterling or dollars which was converted at the official exchange rate and their bids were in line with international price levels. Therefore, when week after week the hard currency countries found that Russia could outbid them, they began to look at other producing countries where this problem did not exist.

There were no separate auctions for exports and domestic sales and therefore over a period of time the steady increase in the domestic consumption and the rupee buying by the USSR resulted in prices going up in rupee terms for all teas in the Indian auctions, and producers began to make handsome profits. When this happened, the workers naturally wanted wage increases, suppliers put up prices for everything and the result was that, cost of production went up. For sometime now, cost of production has been higher than that of other tea producing countries.

USSR was not quality conscious and whatever was produced was bought by them. So, over a period of time, producers began to churn up tea, which meant that workers plucked whatever they could lay their hands on and the slogan "two leaf and a bud" existed only in advertisements. This indiscipline has became a way of life, and it is impossible to bring order without major confrontation with the workers, which is impractical and perhaps even unwise.

During the period the bilateral trade existed, the direction of our exports

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changed and in 1990-91, out of India's total exports, 56 per cent of tea exports, 57 per cent of coffee exports, 40 per cent of tobacco exports, 37 per cent of chemical and allied products, 36 per cent of raw cotton exports, 34 per cent of rice exports and 28 per cent of spices exports went to the USSR. For all these they were paying in rupees and producers, manufacturers and exporters were happy as they were making handsome profits. It became in addiction. And when the disintegration of the USSR took place, the shock was too much to absorb. We had neglected the other markets, in some cases due to justifiable reasons, and today some of the industries are in great difficulties.

Some of the quality conscious producers in Assam and some merchant exporters who believed in quality and good service, kept their link with the UK tea trade and this market was not therefore totally lost. However, having started the plantations in east Africa with the sole objective of ensuring regular supplies, the UK, and other countries that have strong historical ties with the UK tea trade, will not now decide to forget East Africa and come to India.

UNDEPENDABILITY

Domestic tea supplies and price level have been a sensitive point with the Government. There have been instances when the Government had banned export of CTC teas and even not allowed contracted quantities to be shipped because of apprehension that domestic supplies and prices could be adversely affected. In the mid 80's India was branded as an undependable supplier.

Currently tea is being retailed at Rs. 80 to Rs. 100 per kg. and from a kilo of average CTC tea, one can get between 400 to 500 cups, and even more from good CTC teas. The cost of tea per cup is about 20 paise. Tea has been promoted for a long time "as cheap as water". In today's context when a bottle of mineral water costs Rs. 17, tea is the cheapest drink. I was surprised to learn that at the Coimbatore Railway Station the average sales of mineral water per day during summer is in the region of Rs. 15,000. First class and A/c coach passengers cannot be the only buyers of this and the majority are second class passengers. In the last one year coffee prices have shot up astronomically and except for consumer complaints, nothing else has happened. That being the case, why is it that whenever there is a possibility that tea supplies to the domestic market could be inadequate and prices may therefore go up, the Government immediately interferes and not let the market finds its own levels.

Tea industry is a heavily taxed industry at State and Central levels and this perhaps is the only industry that provides free housing, medical facilities, subsidised food and a variety of other facilities to the workers.

COMMITMENT

If we have to compete in the international market and increase our exports, it may be necessary to subsidise exports with profits from domestic sales. The major domestic distribution companies have to have a commitment to increase exports to hard currency countries.

India is fortunate that we have a strong and growing domestic market. I think the current domestic consumption should be around 580 m.kgs. or about 75 per cent of our production. Other producing countries do not have such a fall back position. The domestic demand in Sri Lanka and East Afrcia is very insignificant and they have economic compulsions to export. Outside India and China, tea consumption is not increasing and all producing countries have to fight for a share of the limited market. We face very stiff competition in the international markets. The quality of Indian tea is somewhat overrated and this cannot be the main plank to support our export drive. We have to match price and prove to be dependable.

The tea industry has made handsome profits during the 80's and even now, except for marginal gardens and whenever there is over production, reasonable profits are made. However, even today this industry which is over 100 years old, looks up to the Government for development finance and all kinds of subsidies and loans. Whenever there is a crisis, the industry runs to Delhi for solution. In 1994 there were several press reports of representations from tea producers to the Commerce Minister about fall in auction prices and exports. Does the industry expect the Government to come to its rescue for all its problems? If there is less demand, it is sheer irresponsibility to produce more and then cry.

Even if the industry cannot be accused of having no foresight, it would be difficult to deny that the dynamism that was seen in the field and factories (in increasing yield and innovation in manufacturing processes) was not seen in the Board rooms.

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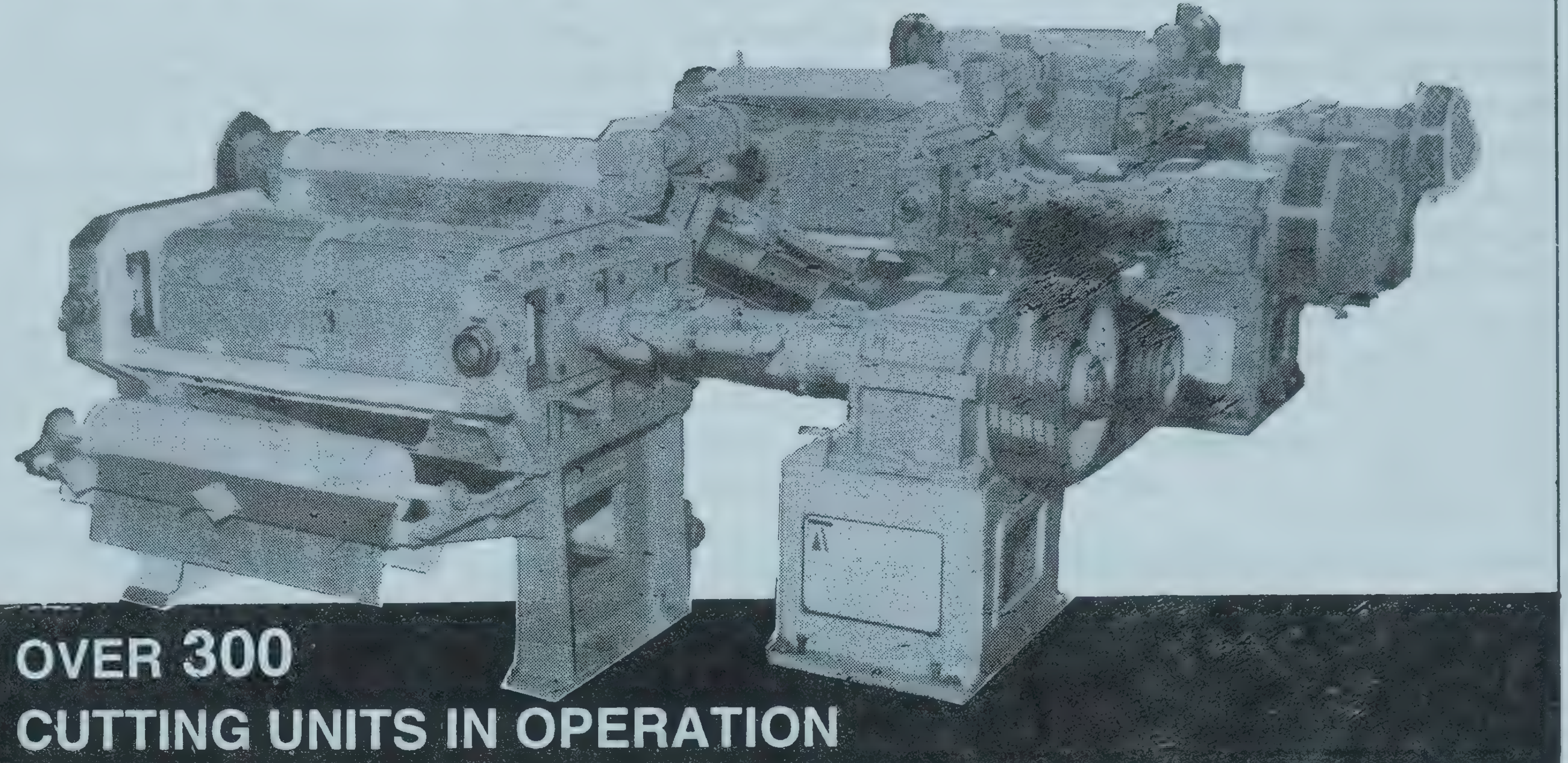

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Outlook

RIGHT TRACK

The present difficulties are temporary. With some sacrifice now, and planning for the future, the Indian tea industry will find itself in excellent health, in just three to four years. Restricting crop to match the demand, uprooting and re-planting the uneconomic sections and attending to other needs in the plantations during the current lull period, will place the industry on the right track. The domestic market is growing steadily with an annual increase of around 20 million kilograms. Even if there is no increase in exports, this alone will absorb the present over capacity and require additional production. The Government need not have any fears about sufficient supplies. This industry has amply demonstrated its capabilities and if there is demand, 1000 million kilograms and even more, is not a target difficult to achieve.

It was reported recently that the Commerce Ministry will undertake a comprehensive review of the tea industry. In this important deliberation, have the Indian Tea Association and UPASI been directly involved?

— **Paper presented at the Rotary Club of Coimbatore Meet.**

EXPORT FROM INDIA, SRI LANKA, AND KENYA & MALAWI

('000 kgs)

DESTINATION	INDIA			SRI LANKA			KENYA & MALAWI		
	1950	1990	+ (-)	1950	1990	+ (-)	1950	1990	+ (-)
U.K.	114585	30371	(84214) (A)	43632	11687	(31945) (A)	4741	101611	96870 (E)
Ireland	10990	1966	(9024) (A)	561	-	-	-	5375	5375 (E)
Germany	991	6000	5009	280	3694	3414	-	222	222
U.S.S.R.	1437	120000	118563 (B)	-	14130	14130 (B)	-	4324	4324
U.S.A.	15967	1933	(14034) (A)	19409	3248	(16161) (A)	1343	5482	4139 (E)
Canada	10850	621	(10229) (A)	10008	2164	(7844) (A)	1461	3118	1657 (E)
A.R.E.	1416	6081	4665 (C)	10245	29620	19375 (C)	-	18643	18643
Iraq	1000	-	-	5021	18883	13862 (C)	-	703	703
Iran	3101	10400	7299 (C)	631	24704	24073 (C)	-	592	592
Australia	7705	710	(6995) (A)	17689	2568	(15121) (A)	-	849	849
Saudi Arabia	-	3754	3754 (C)	N.A.	12081				
Pakistan	-	300	300	-	7227	7227 (C)	-	48027	48027
Persian Gulf Ports	4541	-	-	812	14252	13440 (C)			
Middle East	710	186	-	755	18922	18167 (C)			
Japan	-	3072	-	50	5448	5398			
All other countries	8277	14266	5989	26122	46987	20865	4034	23679	19645
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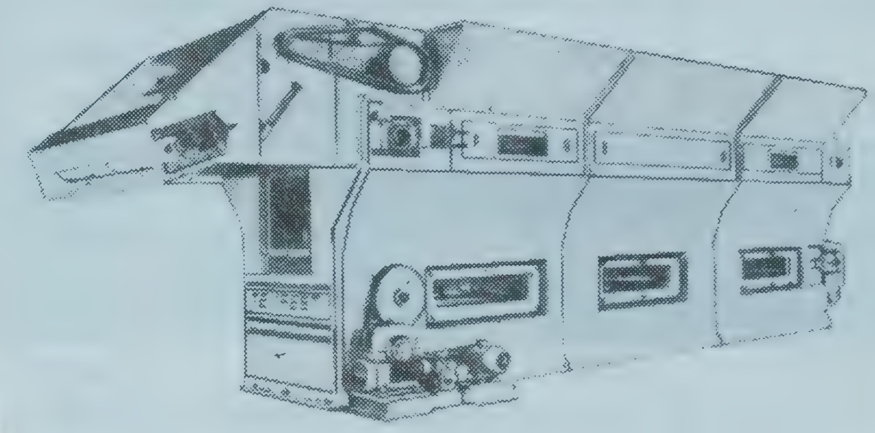

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WAYS AND MEANS TO INCREASE COFFEE PRODUCTION IN INDIA

Dr. R. NAIDU*

Coffee trade ranks next to petroleum products inthe world trade/business. Currently coffee is grown in nearly 80 countries out of these 24 countries produces more than 50000 M.T. of coffee and India is one among them. The total planted area under coffee in the world accounted for 11,909 thousand hectares and India's share in the area towards world is around 2.1 per cent (2.92 lakh hectares) and towards Asia 15.8 per cent and it occupies 14th place in the area under coffee. The world total production estimate for 1995-96 is around 83 million bags against the global offtake of 93 million bags. The India's share in the total estimated world production ranged from 2.43-3.6 per cent and this year it may touch tentative figure of 4.6 per cent (see annexre).

Most experts in the production and trade of coffee agree that the coffee market is characterised by cycles, meaning short period of tight supplies and high prices offset by longer periods of surpluses and depressed prices. Brazil being the large producer and exporter of coffee, its production and stock position strongly affects the rest of the coffee market.

If we look at the future scenario of world coffee, inspired by the high global prices, introduction of liberalised marketing system in many coffee growing countries including India, many producers have turned back to previously neglected plantations with better plant care and fertilisation, this impact may not be felt in the coming season but could be experienced after 2 or 3 seasons. Though a number of individual coffee growing nations have adopted retention plans and quota systems, for stabilisation of prices and better returns for their produce, prices are frequently fluctuating widely every day.

In the present context of better returns there is a wide scope to improve the productivity of coffee in India to offset the high production costs and make the coffee cultivation as a financially viable resource exclusively in small growers' sector who account to 98 per cent of the holdings.

Factors affecting crop growth :

1. Vagaries of the weather condition is a major factor which has a profound impact on coffee crop. (For example incidence of frost and rainfall pattern).
2. The other factors are non scientific cultivation, unsuitable location, delay of timely inputs, improper handling and pruning systems, shade management, monitoring of soil physical and chemical factors, adverse biological properties of soil, delayed blossom shower/backing shower, old/moribund plants, non availability of water resources and irrigation facilities, poor management of pest/disease attack, managerial strategies, socio-economic background of the grower etc.

Strategies to improve the production :

a) Adoption of fertilising practices based on soil and leaf test data for efficient, appropriate and economical manuring policies for uniform sustenance of crop production.

b) Maintenance of optimum shade pattern to even out the erratic yield. Planting of shade trees of suitability and economic value which add to the land resources.

c) Introduction of disease resistant coffee varieties suitable to the location will contribute significantly in reducing the coffee production costs.

---

* Director of Research, Central Coffee Research Institute, Coffee Research Station - 577 117.

d) Pests have to be controlled when they exceed economic thresholds. Attention to be focused on integrated pest management including control methods like sanitary, cultural, insecticide and biological control.

e) Introduction of short and long-term range planning for maximum utilisation of the available resources.

f) Careful processing should be practiced to produce the high quality coffee with value addition.

g) Recommended coffee husbandry practices may be followed strictly for raising good seedlings / clones. Adopt suitable spacing for each cultivar.

h) Combined use of manual and chemical (contact, systemic and soil acting) weed control methods will effectively control the menaces of weeds and yield loss of coffee.

i) Soil moisture preservation is necessary through mulching which is advocated with dry jungle litters. This practice improves soil structure, organic matter status, water holding capacity, surface soil temperature, soil mineral nutrients, suppression of weeds etc.

j) Coffee may be pruned periodically. This involves thinning out unwanted branches so as to maintain a suitable crop/leaf ratio for good cropping level and maintenance of high proportion of large beans, open the tree centres to facilitate disease and pest control, for penetration of more light and for easy harvesting.

k) Introduction of individual bush management concept at a micro level rather than unit area requirement is more appropriate. Training inputs to the different managerial level including the skilled and semiskilled labour will ensure maximum returns to the growers.

l) Water management plays a vital role in sustaining a higher levels of yield. Installation of sprinklers and induction of drought management practices ensure the higher crops. There are many estates in the corporate/private sector, with their good managerial skills and application of scientific cultivation practices is realising yield of 3-4 tonnes/ha in robusta and 2-3 tonnes/ha in case of arabica, with minimal variation in yielding pattern.

Increasing our present production by 3 folds through increased productivity by scientific cultivation may not have any pronounced effect on the international coffee market as our share is negligible. On the contrary we will be in advantageous position due to low production cost than other major producers of coffee.

— **Paper presented at the UPASI-KPA Coffee Conference held in Bangalore on November 6, 1995.**

ANNEXURE

The projections of coffee production in the world (Million bags of 60 kgs).

Year	Production/ estimates	Global requirement
1994-95	90	92
1995-96	83	93

Source : Indian Coffee-April and September 1995

INDIA'S SHARE IN WORLD PRODUCTION

INDIA Vs WORLD

Year	Production in 1000 bags of 60 kgs		
	World	India	% Share
1992-93	88,601	2,151	2.43
1993-94	88,210	3,143	3.56
1994-95	86,438	3,000	3.47
1995-96*	83,000	3,833	4.60

Source : Data base Coffee Board (1.10.1995).

* = Tentative.

DEVAMACHY AND COFFEE BREEDING

A GROWER'S VIEWS

Devamachy is supposed to be the name of a coffee estate in Coorg district of Karnataka State. It was here that a natural hybrid coffee plant between robusta coffee and arabica coffee was found. This hybrid coffee was named Devamachy and was established at the Central Coffee Research Institute, Balehonnur, as early as 1949.

Indian coffee scientists were amongst the first in the world to give importance to disease resistance in their breeding programmes. The first rust-resistant hybrid varieties were released in India more than fifty years ago, even before the Coffee Rust Research Centre was established in Portugal. Coffee breeders the world over were interested in interespecific hybrids between arabica coffee and robusta coffee mainly to introduce the vigour and disease resistance characteristics of robusta into arabica coffee. It was probably for the same reasons that the Devamachy hybrid was used by the coffee breeders at the Central Coffee Research Institute, Balehonnur, in their breeding work.

In 1972 seeds of Devamachy crosses, also known as Selection 5, were given by the Central Coffee Research Institute, Balehonnur to coffee growers for multilocation trials. There were three lines given. One was Devamachy crossed with S. 881 and released as S. 2269. The second was Devamachy crossed with S. 333 and released as S 2931. The third was Devamachy crossed with S. 795.

S. 2931 proved to be superior to the other two crosses. It was comparatively rust resistant and could thereby overcome the alternate year bearing habit that arabicas susceptible to rust exhibited. The plant established easily and the hybrid vigour was evident right from the time the first pair of leaves came out. A friend who had taken up to coffee planting after being a successful chemical engineer, took a truck load of S. 2931 plants to plant in his estate in 1980.

After a year, when asked about the performance he said that they were doing well inspite of him having planted them in the field without removing the nursery poly-bags! Such is the vigour of this material.

S. 2931 has been under trial for many years now. It has finally got its due recognition. The Souvenir released by the Central Coffee Research Institute at its last field day states that Sln. 5 (S. 2931) and Sln. 9 have been identified as suitable alternatives for S. 795 for the Pulneys.

With liberalisation of the Indian economy and with the coffee grower having to fend for himself in the markets, the quality aspect to breeding has to be looked into. For, isn't it a fact that the other parent of S. 2931, S. 333 had high bean abnormalities and was subsequently discontinued from being cultivated? How does the S. 2931 bean compare with the Catimore bean or with the S. 2372 bean? Was it to improve the bean size and the quality that Devamachy was crossed with the wild Ethopian arabicas? In the ultimate analysis isn't coffee breeding all about evolving a coffee variety that, amongst other things, gives the maximum net revenue to the cultivator of coffee?

Thinking aloud, has the full potential of Devamachy been exploited? If it hasn't, it could only be because of the variety Hibrido-de-Timor which is also believed to be a natural hybrid between robusta and arabica coffee and is grown extensively in Timor Islands. It is not only resistant to leaf rust but also to coffee berry disease and is now being widely used in coffee breeding work throughout the world. Had it not been for this material, Hibrido-de-Timor, we would not have had the wonder plant Catimor (Caturra X Hibrido-de-Timor) Who knows, we might have had a better plant in Catimachy (Caturra X Devamachy)!

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CONSUMER'S CHOICE

Excerpts from the speech delivered by the ITC Group Chairman, Mr. K.L. Chugh, at a National Human Resource Development Network Conference.

As India prepares to enter the would market in a much bigger way, the first issue that we need to take care of is quality. Today, the consumer to whom we owe our existence is looking for quality. Good companies are not built on investments and returns. A company that cannot provide good value to its consumers by making available quality products and efficient low cost will not be able to claim its loyalties. The purpose of business is to conceive what the consumers wants, design as well as provide quality products : Deliver what the consumer wants or perish. Deliver the right quality, at the right time.

We are in the process of rediscovering India and our own roles in the new India. What is the change which is compelling us to relook at India and our own roles? The one change that has happened is that of the consumer saying, "Finally, I have won the battle" This battle has been a very simple one. He has always said, "I must have a choice". All of us are consumers, too. It has always intrigued me that, while within the corporation we talk one language, outside in the marketplace we speak a different one. When I have to put my hand in my pocket and take money out I think differently. I want a choice. But when I am on the production line, or inside a corporation, I think differently : I do not want the consumer to have a choice. At least for 46 years, the Indian producer did not want the consumer to have a choice. The consumer is also reminding us that with the changes that are happening, he can have a choice from around the world. This is a simple change and I think that it is his due. All that you and I have is a choice which we could never exercise before. We have moved to a market oriented economy, from the product driven one of the past. Why is this sending panic signals? This is a question which we have to ask ourselves. Have we neglected the consumer and are now suffering the consequences? The consumer is demanding a price which is competitive. He is also demanding service. And, for the first time, we have been caught.

I have been saying that the "Customer is God" He is not "King" He is the reason for our existence and if he is saying "deliver", why are we panicking? He is going to go a step further and say, "Deliver to international standards"

We all want international quality and we talk of international quality performance and excellence. That is really all that the consumer is waiting and that is what we call the new environment. I believe that we have not given the consumer the attention he deserves. Therefore, if we just get back to understanding and doing what we always knew, maybe that would be rediscovering ourselves and a new role.

We, at ITC, are looking at the issues of profits through manufacturing. My objective as the Chairman was to explore areas which we had not explored so far to enhance profits. The target was obviously manufacturing. Often we think that there is money to be made in the marketplace. This is true, but money should be made in the marketplace by giving consumers the best value. Money should be made after the manufacturing is efficient and after we have passed our efficiencies to the consumer, not before that. ITC has increased profits by as much as 30 per cent in a financial year without increasing prices.

When the issue of flexible manufacturing comes up, there are two very important aspects to it . First, that a factory is a bundle of competencies – Unbundling these is an art where people related to technology and HRD go together, And second, which is obvious in today's reality, flexibility in range, mobility and yet uniformity of quality all the time. I think these two statements – whereas they come from the technology side – are equally applicable to human resources. The challenge, if there is a challenge, is to create more flexibility amongst people.

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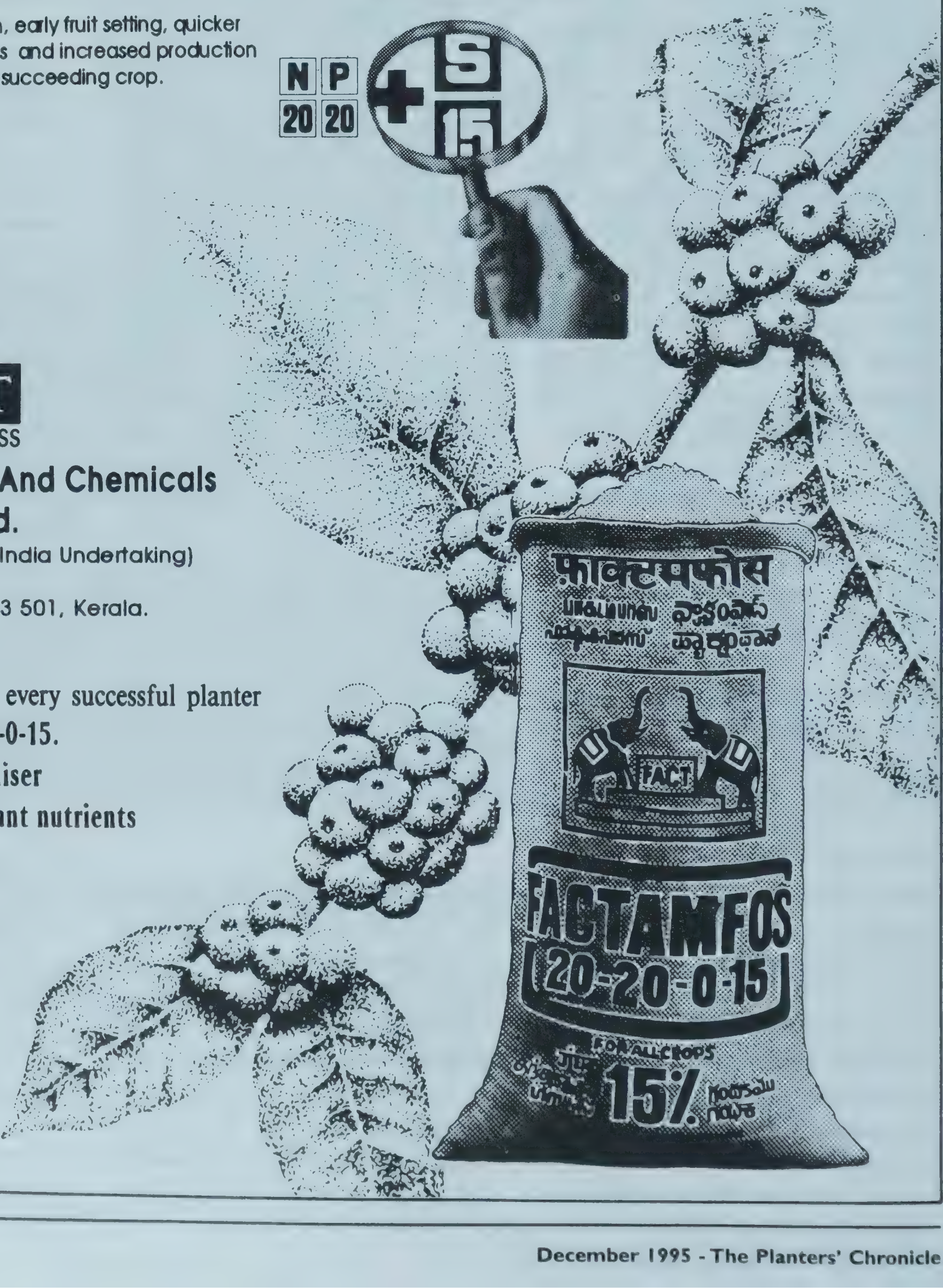

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business environment, we will have to start at the beginning. By redefining the very parameters of business within we seek to function.

Business is people. We often hear people talking of business as being a people's enterprise and even synonymous with people. But today when talking of people, we can no longer think in terms of management alone. Business is no more a mere commercial entity. Business is actively involved in building relationship, between the management and workers, between the company and society at large.

Business is trusteeship. We cannot afford to forget that business combines the concerns of people both within and without an organisation. And can only hope to flourish if it remembers as much. Even as we work, it should be our constant endeavour to nurture feelings of faith, care and concern. This was the basis of Gandhiji's philosophy of business as trusteeship.

Business is service. The prime focus of business has undergone a sea change. From supplying whatever is produced quite oblivious to customer requirements, industry today has to wake up to the realities of a situation where it has to supply whatever its customers want. Nothing more, nothing less.

Business is knowledge. But service not founded on adequate knowledge is always superficial and thus incomplete. Not only of one's company and its produce, but knowledge of the consumer, his location, his likes, dislikes and alternatives at his disposal.

Business is communication. Effective communication is an integral part of the service offered by any successful business enterprise.

Business is statesmanship. The success of any business rests almost solely on the development of a community of interests between employees, and management, the strength of a relationship that seeks to work together towards the betterment of the company. Business is no longer a mindless dictatorship, If anything, the secret of business lies in thoughtful statesmanship.

Business is creation. As business deals with people, their cares and concerns, and attempts to serve them to the best of its ability by taking them into confidence, business is also a creative process which finds its source of strength in man's aspiring to greater heights and perfection.

The biggest problem facing us as a nation today is the lack of technology. We can borrow technology. We can conclude strategic alliances but we still have to start creating technology . We have to absorb technology. We have to have great engineers.

Somehow we have given engineers second class citizenship and this is telling on the shopfloor. Otherwise, why are we talking about quality? Why are we talking about cost or price? Why are we talking about delivery? Why do quality, cost and delivery frighten each one of us? The simple reason is that we do not produce quality and we are scared that we cannot produce quality. We are scared that we cannot manage cost. Cost, quality and delivery are, in sum, productivity. Otherwise there is great danger that in some minds cost cutting is the business, when it is not. Investment is the business, productivity is business, cost reduction through innovation is, therefore, productivity. Why? We are scared that we are not able to produce productivity. Why? We do not have the ideas.

To me, managing people and customers is the real role of a business leader. Success stories the world over, highlight that great business leaders understood their customers and then created great enterprises to satisfy their needs. Creating dynamic, successful enterprises *for* people (consumers) and *by* people is the complexity all of us are engaged in. Business is holistic and cannot succeed on unidimensional prowess. Business needs great marketers who understand and serve the consumers; great engineers who create products and innovate for the consumer and financial wizards who keep the machine well oiled.

The word 'Managing' has developed many connotations to me. In today's context, it stands for only one thing "Managing the customer". This is singularly the most important task. Those of us who have not forgotten this will prosper and will continue to prosper — even faster. Those who had forgotten the customer will have to acknowledge his presence — indeed omnipresence — and learn to understand him.

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CONSUMPTION

DOMESTIC CONSUMPTION OF TEA IN INDIA

by

S.M. JAIN*

Though tea production and export figures in our country are submitted by the tea producers and the exporters to the Tea Board, there is no such system by which Tea Board can announce the consumption figures of tea in our country from time to time. To arrive at the consumption figures of tea, one has to subtract the export quantity from production which gives the retention of tea in our country. And this retention is presumed to be the consumption with plus / minus of carry forward stocks.

A report on "Domestic Consumption of Tea in India" has been prepared by Prof. V.N. Reddy and Prof. Amitava Bose of Indian Institute of Management, Calcutta. A report on the same subject was also prepared by them in 1984.

After consulting these reports and after carefully studying the historical trends of tea production, exports and consumption in our country, I have come to my own conclusions.

Population : Every year tea consumption in our country increases because of increase in population. The census figures reveal that from 683 million people in 1981, it increased to 846 million in 1991. To arrive at the yearly per capita consumption of tea, the population increase has been taken as per "Statistical Outline of India 1994-95 – Dept. of Economics & Statistics". The production and export figures have been taken way back from the year 1980 to the latest year 1994.

Domestic consumption : From the year 1980 to 1994, production and export of individual year have been taken. Average of 3 years' production and average of 3 years' export have been calculated and the retention (3 years' average production minus 3 years' average export) is being treated as home consumption. As fluctuations in tea production depend inter-alia to a large extent on vagaries of climate, an average of three years is reckoned as reasonably dependable figure.

Per capita consumption : After dividing the domestic consumption (i.e. retention) by population we arrive at the per capita consumption of Tea of that year.

Projections from 1995 to 2001 : The increase in population has been taken as projected by the "Statistical Outline of India 1994-95 — Dept. of Economics & Statistics". The pattern of increase in per capita consumption shows that on an average it has increased by 7 grams during the span 1980-1994; by 2 grams during 1980-1985; by 6 grams during 1980-1990; by 9 grams during 1985-1990; by 9 grams during 1985-1994 and by 8 grams during 1989-1994. Based on this trend, the average increase has been taken at 8 grams per year from 1995 to 2001.

On the basis of the aforesaid analysis in respect of population growth, retention for domestic consumption, per capita consumption and projections for future domestic consumption in our country, I tabulate the same in the following manner :

Domestic Consumption : 1980-1994

Year	Production in million kgs.		Export in million kgs.		Retention : Domestic consumption in million kgs.		Population in millions	Consumption per capita in grams
	Actuals	3 yrs. Avg.	Actuals	3 yrs. Avg.	Actuals	3 yrs. Avg.		
1980	569	559	224	200	345	359	666	539
1981	560	558	241	222	319	336	683	-
1982	561	563	190	218	371	345	698	-
1983	581	567	208	213	373	354	720	-
1984	640	594	217	205	423	389	736	-
1985	656	626	214	213	442	413	750	550
1986	621	639	203	211	418	428	767	558
1987	674	650	202	206	472	444	783	567
1988	701	665	201	202	500	463	800	579
1989	688	688	205	203	483	485	817	594
1990	720	703	209	205	511	498	831	599
1991	754	721	202	205	552	516	846	604
1992	704	726	175	195	529	531	866	613
1993	758	739	180	186	578	553	878	629
1994	744	735	149	168	595	567	894	635

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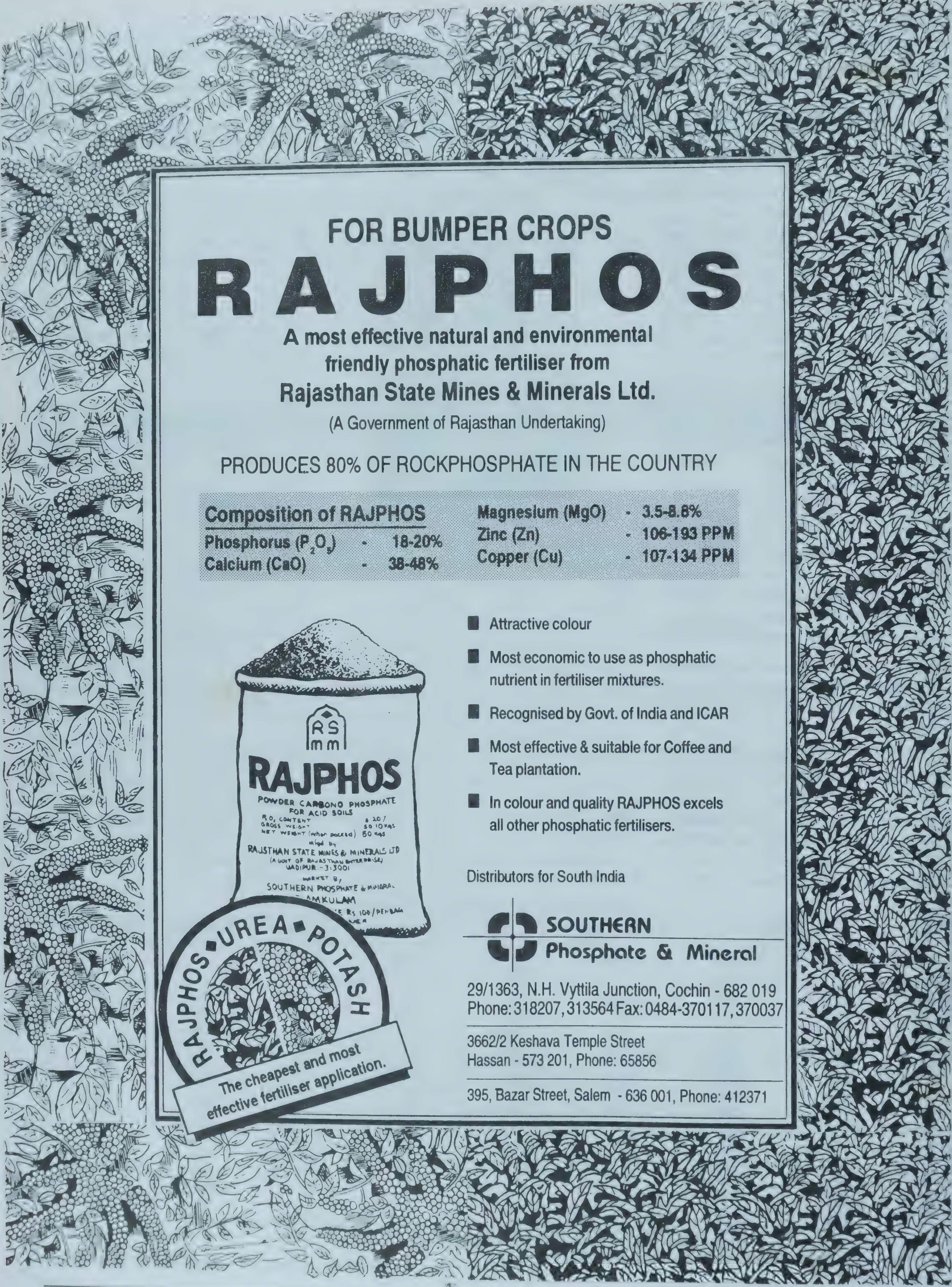
* President, Tea Association of India, Calcutta.



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Projections for Domestic Consumption : 1995-2001

Year	Production in million		Estimated per capita consumption : grams		Estimated total consumption in million kgs.	Estimated by Prof. V.N. Reddy & Prof. A. Bose in their report : consumption in million kgs.
1995	909	x	643	=	585	596
1996	925	x	651	=	602	613
1997	941	x	659	=	621	632
1998	957	x	667	=	638	651
1999	972	x	675	=	656	671
2000	988	x	683	=	675	692
2001	1004	x	691	=	694	713

This difference between my estimates of domestic consumption of tea and that of the Report as per the above Table may be for the reasons that whereas I have anticipated an increase of eight grams per capita per year from 1995 and onwards, Prof. Reddy has taken the same at 6 grams. Secondly, upto the year 1994 whereas I have taken the average of 3 years (the year under review plus the two immediate preceding years) production and exports to arrive at the retention (domestic consumption), they have not done so. This partly explains the difference of 11 m.kgs. in the starting year of 1995. And thirdly, I have taken the population as per the "Statistical Outline of India 1994-95" whereas they may have taken the same at 2 per cent compounded yearly.

Notwithstanding this difference in the analysis, the fact remains that in the next 6 years (from 1995 to 2001) the home demand for tea is projected to increase by an average of 18 m.kgs. per year or a total of 109 m.kgs. as shown in the table above (I have projected an increase of 109 m.kgs. whereas the Report envisages an increase of 117 m.kgs. in the home demand which is an average of 113 m.kgs. in 6 years or an average of 19 m.kgs. per year).

CHALLENGES

Now, let us consider what is the challenge which lies before the tea industry? Notwithstanding all the good intentions of the Commerce Ministry and the Tea Board in exhorting the industry to increase the exports to 180 m.kgs. in the current year and to 240 m.kgs. in the year 2000, let the tea industry at least see to it that the exports catch up with the last 3 years' average level of 170 m.kgs. and is maintained at least at that level. In the year 2001, with home consumption of tea at 694 m.kgs. plus 170 m.kgs. of exports, the total availability has to be 864 m.kgs. In the current year of 1995, we may at the most have a crop of 725 m.kgs. This means, in the next 6 years upto 2001, we have to increase the crop by 139 m.kgs. or an average of 23 m.kgs. per year.

If we have a glance at the crop figures during the period from 1980 to 1994 given in the table above, we can pick up the lowest figure of 561 m.kgs. of 1982 and the highest figure of 758 m.kgs. of 1993, an increase of 197 m.kgs. in 11 years, i.e. an average yearly increase of 18 m.kgs. Again let us take 621 m.kgs. of 1986 and 758 m.kgs. of 1993 giving a crop increase of 137 m.kgs. in 7 years or a yearly average of 20 m.kgs. In this backdrop, shall the tea industry be able to increase the crop from 1996 onwards upto 2001 by an yearly average of 23 m.kgs.? Yes, the industry is capable of meeting this challenge given the assistance and support from both the Central and State Governments.

STATEWISE CONSUMPTION :

Another interesting feature of the Study on our domestic consumption of tea is the pattern of consumption in individual States of our country. Whereas Jammu & Kashmir has the highest per capita consumption of 1594 grams followed closely by Punjab 1525 grams, Gujarat 1222 grams and Kerala 1100 grams, it is the lowest per capita consumption of 232 grams in Bihar, 276 grams in Orissa, 366 grams in Tamil Nadu and 376 grams in U.P. Again it is noteworthy that in terms of total quantity consumed, Maharashtra is on the top slot with 83 m.kgs. representing about 15 per cent of the total domestic consumption though the percentage of population is 9 per cent. In contrast, the most populous State of U.P. having a population of 16.6 per cent consumes 9.8 per cent of the total country's consumption. Based on the consumption and estimated population figures of 1994, the Statewise consumption of tea in our country is depicted in the following Table :

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Consumption

Consumption of Tea in India : Statewise : Year 1994

State	Population		Tea consumption		
	Millions	%	per capita grams	Million kgs.	%
Andhra Pradesh	69.8	7.8	441	30.8	5.4
Assam	24.0	2.7	714	17.1	3.0
Bihar	92.3	10.3	232	21.4	3.8
Gujarat	43.2	4.8	1222	52.8	9.3
Haryana	17.4	1.9	1026	17.8	3.1
Jammu & Kashmir	8.2	0.9	1594	13.0	2.3
Karnataka	47.3	5.3	750	35.5	6.3
Kerala	30.4	3.4	1100	33.4	5.9
Madhya Pradesh	70.1	7.8	618	43.3	7.6
Maharashtra	82.6	9.2	1000	82.6	14.5
Orissa	33.3	3.7	276	9.2	1.6
Punjab	21.0	2.3	1525	32.0	5.6
Rajasthan	47.5	5.3	818	38.9	6.9
Tamil Nadu	58.1	6.5	366	21.3	3.8
Uttar Pradesh	148.2	16.6	376	55.7	9.8
West Bengal	71.5	8.0	464	33.2	5.9
Other parts	29.5	3.5	983	29.0	–
	894 Million people	100 %	635 grams per capita	567 Million kgs.	100 %

It is evident from the Table that the populous and big States like Bihar, Orissa, Tamil Nadu, Uttar Pradesh, Andhra Pradesh and West Bengal have a low per capita consumption of tea, ranging from 232 grams in Bihar to 464 grams in West Bengal. Whereas these six States account for 473 million people i.e. 53 per cent of our population, the total tea consumption in these 6 States is 172 million kgs. which is only 30 per cent of the total consumption. The average per capita consumption of these 6 States comes to 364 gms. against the all India average of 635 grams in the year 1994. There is good scope of increasing the consumption of tea in these States. The tea industry should lay emphasis on generic promotion of tea in these regions.

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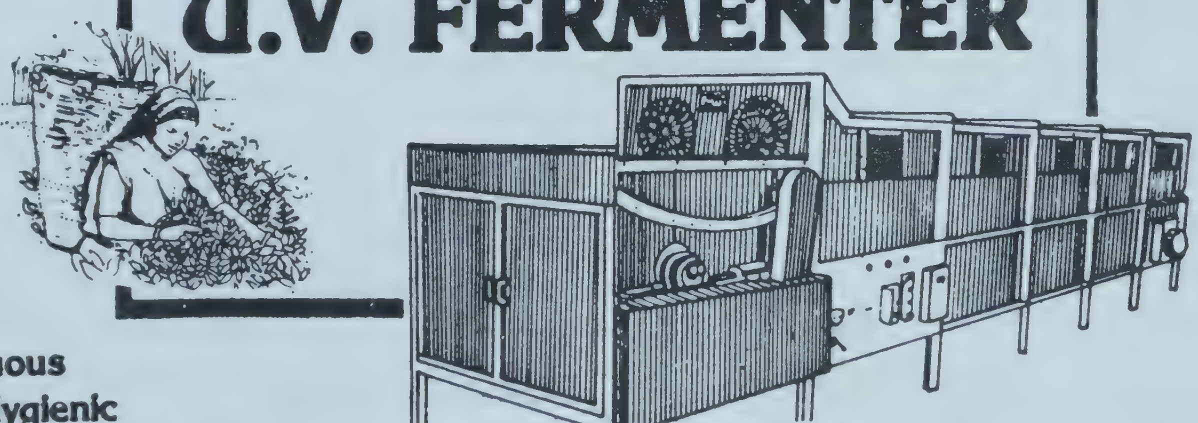

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TECHNIQUE

BROWN BAST OF RUBBER TREES

By

P.P. CHERIAN*

The main causes of tapping panel drying of rubber trees known as Brown Bast (BB) so far eluded investigation in all the main rubber producing countries during the last so many decades. With the advent of modern high yielding varieties such as P.B. 260, RRII 105 etc. Originated from one of the Malaysian parents P.B. 5/51 and GL 1 respectively equally susceptible to BB, the problem has become acute when tapped half-spiral alternate daily throughout the year with rain guarding in the wet seasons when more than 15 per cent of trees become affected by it after a few years tapping. Change-over to third daily-tapping advocated along with the utilisation of rain guards, though practical and economical for estates, may not suit lakhs of small-holdings mostly below two hectares each but from which not less than 50 per cent of our total rubber production emanated with no labour problems as in estates.

These aspects were brought out in 1987 in the Planters' Conference, Kottayam, and in the International Natural Rubber Conference, Bangalore, in 1992 in two papers (I) both organised by the Rubber Board. The first had been published in the Planters' Chronicle (I) while the abstracts of the latter by the Board. Both included the yields of RRII 105 under third daily tapping throughout the year with rain guarding during the monsoon as well as alternate days conjoint with resting during wintering in February and June/July monsoon for meaningful comparison of yields in no way less than realised without resting.

Following another seminar organised by the International Rubber Research and Development Board abroad on the various aspects of BB, the well known Malaysian magazine "Planter" in its editorial (May, 1990) "Why does the Tapping Panels Go Dry?" Also reviewed some of the controversial aspects of BB.

Meanwhile the RRI in Malaysia started advising for giving annual resting from 2 to 3 months to obtain uniform and sustained yield from mature young budded rubber irrespective of alternate or third daily tapping system. The Malaysian Advice cited in the International Natural Rubber Conference, Bangalore, prompts an interesting aspect as to whether BB can be controlled or minimised in small-holdings by resting susceptible clones like P.B. 260, RRII 105 etc. in India during February, the least production season, and in June/July, the heaviest raining period, followed by alternate day tapping throughout dispensing with the use of rain guarding in the June/July monsoon. Until more satisfactory control measures against BB become available, large estate like Malankara has raised the initial planting density from 170 to 200 per acre to provide for casualties affected by BB.

It may be recalled that both the small-holders and large-estates in Kerala had been resting mostly unselected ordinary rubber trees during wintering and rainy season before the advent and utilisation of modern high yielders.

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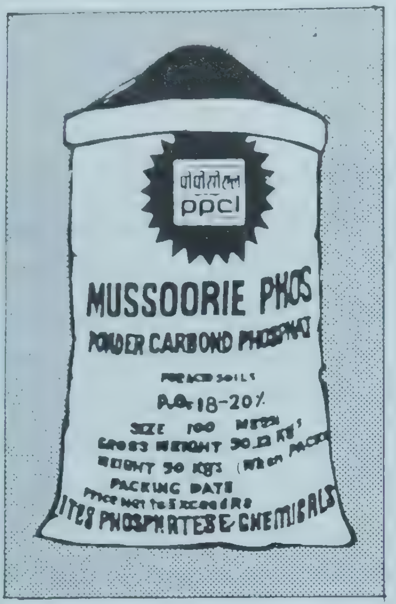
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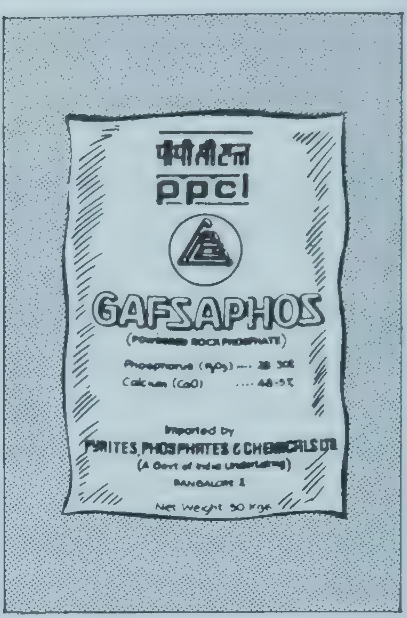
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CONSERVE WATER FOR A BETTER FUTURE

By

Dr. KAMALAM JOSEPH

Kerala receives on an average 3000 mm rainfall which is not uniform in spatial and temporal distribution. The distribution is such that about 70 per cent of the total annual rainfall is received in a time span of five months. The unique undulating topography of the State and the narrow width from Ghats to the seas results in a fast flow of the rainwater into the sea. Thus during less than half of the year only, precipitation exceeds evopotranspiration and hence it is the management of rain water during this period which receives great attention. Rainfall, runoff, flooding and drought take a cyclic chain. Adequate water infiltration, luxuriant vegetation, regular flow from springs and rivers, a good level of soil moisture (even in summer) and regular water supplies to wells and bores are to be achieved out of the rainfall received. Although man cannot alter the atmosphere or the amount and frequency of precipitation, he can bring about changes in three vital sectors ie. runoff, infiltration and to a lesser extent evaporation. Runoff water can be intercepted on its way downhill by forcing to infiltrate into the soil or by storing. The measures that can be adopted for water conservation falls into three major groups viz; crop and vegetation management, soil management and mechanical measures.

1. CROP AND VEGETATION MANAGEMENT

Agronomic measures for soil conservation are based on the role of plant cover in reducing erosion. Vegetation intercepts the rain drops and dissipates their kinetic energy, the degree of which varies with the crop. Thus crop planning in a region has a major role to play in conservation of water. In designing a water conservation strategy, the following measures can be adopted wherever possible.

Contour farming

Here, all the farming operations are done along the contour. By doing so, each furrow acts as a miniature reservoir to hold the excess runoff and gives the soil increased time and opportunity to absorb as much water as possible. Effectiveness of contour farming varies with steepness and length of the slope. This technique works well during storms of low rainfall intensity and is most effective in land slopes of two-eight percent. Tillage should be done paralles to the contour line. On average hill slides the first contour line should be laid about 1-1.5 M vertically below the top of the hill. Studies have shown that contour cultivation together with grassed waterways reduced runoff to 75 to 80 per cent at the beginning of the season. For best results on steeper slopes contouring should supplement other conservation practices like strip cropping, terracing or bunding.

Crop rotation

The simplest way is to combine different crops and to grow them consecutively in rotation. The frequency with which row crops are grown should depend upon the severity of runoff. A high rate of soil and water loss is expected in row crops. Suitable crops for use in rotations are legumes and grasses. These provide good cover, help to maintain or even improve organic status of the soil and enable a most stable aggregate structure to develop in the soil. This is a long lasting effect which helps the soil to hold more water.

Cover Crops

Cover crops are grown as a conservation measure either during the off season or a ground protection under trees in plantation, eg. *Puraria phaseoloides, Calapagonium muconoides, Centrosema pubescens* etc. These crops cover the soil during monsoon season and help to imbibe as much water into the soil as possible. At the same time, top soil loss is also prevented. In summer season, these crops will dry up, thus will form a good dead mulch over the soil and prevent the evaporation of soil moisture. Crops like cowpea or stylosanthes which have an added product value may be more acceptable to the small farmers.

Livebunds

Grasses which form effective hedges will obstruct the movement of

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* *Scientist, Centre for Water Resources Developments and Management, Kozhikode - 673 571.

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runoff water, as a result of which, soil particles will settle near the live bund allowing only clear water to ooze out through the barrier. Possible drawbacks are (i) hedge may become ineffective in serving the purpose due to development of gaps and (ii) uncontrolled growth of hedge if occur may affect the crop growth.

Mulching

Here the soil is covered with crop residues such as straws, palm fronds or standing stubble. The cover protects the soil from rain drop impact and reduces the velocity of runoff. From a conservation view point the mulch stimulates the effect of a plant cover and favour infiltration. It is most useful as an alternative to cover crops in areas where the establishment of a cover crop is not possible or where a cover crop competes with the main crop for moisture. A mulch should cover 70-75 per cent of the soil surface. With straw an application rate of 0.5 kg/m^2 is sufficient to achieve this. Mulching on its own is not always an appropriate technique but when it is combined with other methods this is useful.

2. SOIL MANAGEMENT

The aim of a sound soil management is to maintain the fertility and structure of the soil. Highly fertile soils encourage good plant growth and effective root system which helps to conserve more water in the soil. Soil management is possible through the following measures:

Organic matter additions

Organic matter improves the cohesiveness of the soil, increases the water retention capacity and promotes a stable aggregate structure. The effectiveness depends on the quantity of humus which it produces. Organic material may be added as green manures, straw or as fermented manures. Green manures which are normally leguminous crops, when ploughed in have a high rate of fermentation. However, the increase is short lived. Continuous use of mineral fertilisers without organic manures may lead to structural deterioration of the soil.

Tillage practices

Ploughing opens up the hard layers and increases the infiltration and storage capacity of soil. Summer tillage helps in reducing runoff by increasing infiltration. Excessive tillage will destroy soil structure which in turn will reduce the water holding capacity of soil. Shallow surface cultivation immediately after harvest of the crop and later in the off season helps in keeping the soil open and also prevents weed growth.

Soil stabilisers

Improvement in soil structure can be achieved by applying soil conditioners which may consists of organic by-products, polyvalent salts such as gypsum ring about flocculation of the clay particles while organic by-products bind the soil particles into aggregates. Gypsum is found to reduce surface crusting and runoff on red soils of certain places.

Vertical Mulch

Here, furrows of approximately 45 cm deep and 22 cm wide are taken across the slope at 4-8 m intervals and packed with stalks of plants. The packing should portrude beyond the soil surface by about 15 cm. This facilitates in water intake.

Dead furrows

Another simple method of increasing water intake is providing dead furrows at regular intervals of 2-4 m. These furrows will arrest runoff and provide more time to water to move into the soil profile. In low rainfall areas this will be very useful.

Husk burial

Burying of fresh or dried coconut husks in soil is a desirable practice particularly for moisture retention. The husks can be buried either in linear or circular trenches taken at favourable distance from the basement of plants/trees. The trenches may be 0.5 m wide and as deep. The husks are to be placed in layers with concave surface facing upwards and covered with soil. The beneficial effect of husk burial will last for about 5-7 years.

3. MECHANICAL METHODS

A range of mechanical techniques is available and the decision on which to adopt depends on the severity of the problem, the location and the cost bearing capacity of the farmer. Mechanical methods are normally effective when employed in conjunction with agronomic measures. The following are some of the mechanical methods which help in water conservation.

Contour bunds

Contour bunds are earth banks of 1.5 to 2m wide thrown across the slope to act as a barrier to runoff and to break up a slope into segments shorter in length than is required to generate overland flow. Contour bunding is a good practice for sloping cultivated land, but as it is true with any measure, if not strictly

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followed contour bunding may not give the desired benefit but on the other hand in some cases it may cause more damage. This method is suitable for slopes of 1 to 7 degree and can be used in small holdings. A considerable rise of the water table has been observed in contour bunded fields.

Terracing

A terrace is an embarkment or ridge of earth constructed across a slope. It reduces the hill side slope and thereby sheet and rill erosion. Terracing cannot be justified on crop land that can be protected by less expensive conservation measures. Agronomic measures such as contour tillage, crop rotation, and strip cropping are sufficient in many sloping areas. Terracing should be done based on the specification of the soil conservation department and should always be supplemented with the best possible cropping practices.

Bedding system

This is a system having a furrow at every few rows of crops across the slope on a grade of 0.2-0.4 per cent. Even if a few rows are lost due to the furrow, yields are made up due to better institu moisture conservation.

Vegetated outlets and waterways

Vegetated waterways are natural or constructed water courses covered with erosion resistant grasses used to carry discharge from the system. The grass in the waterways should be established before any water is turned into it. Waterways should generally be located where natural depressions are not available, constructed waterways should preferably be located along field boundaries. Channel slope should not exceed 10 per cent while it is normally desirable to keep the grade within five per cent.

To establish a grass waterways the first step is to shape the channel to a proper design width and depth. A good seed bed is then prepared. Soil in the waterway should be brought to high fertility level in accordance with soil and plant requirement. Grass may be planted by transplanting or be seeding. Depth of planting varies from 1-2 cm. Maintenance should be done properly.

Trenching

In this method, trenches are excavated in a particular fashion so as to conserve water. The two commonly used types are given below.

a. Contour trenching :

Here, trenching is done at a uniform level or at a particular contour across the slope in steep slopes. Trenches are usually not more than 15 m long. The main idea is to create more favourable moisture conditions and thus accelerate the growth of planted trees. In the cross section they rarely exceed 0.3 M x 0.3 M. These trenches are meant to intercept the runoff and convey it to a vertical disposal drain excavated at suitable intervals along natural folds of hillocks or valley without causing erosin.

b. Staggered trenching :

It is a practice of excavating trenches of shorter lengths in a row along the contour with interspace between them. Suitable vertical intervals between the rows are restricted to impound the runoff expected from the above, without overflow. A common practice is to have staggered trenches of 4 m length at intervals of 4 m along a contour line. Trenches in the lower line will be staggered with those of upper lines.

Pits, Ponds and Tanks

Staggered pits of convenient size dug out in the field provide scope for water storing. About 100 pits can be taken in one hectare of land and a minimum of 40,000 litres of water can be stored. The dug out soils should be properly placed towards the lower side so that the soil will not get eroded in rainfall. There is chance of silting up of the pits and it is advisable to desilt the pits once or twice an year and the silt can be put in the basin of trees.

For design of ponds to store runoff it is essential to know the peak rate and volume of runoff in the area, volume of water that is to be stored, the quantity of stored water which will be used etc. Dug out ponds or excavated pits may sometimes need lining for water course if taken in sandy soils. It will be more appropriate to construct only a few structures in the first phase of watershed development. Remaining may be constructed based upon the observations on rainfall-runoff behaviour in the watershed.

CONCLUSION

There is a great scope for more efficient use of rain water through watershed management in rainfed areas. Runoff rate and volume are affected by amount and intensity of rainfall, slope of land, nature of soil, land use, land management and conservation practices adopted. Amount and intensity of rainfall and the rainfall type cannot be modified. However land use, land management, slope of land and conservation practices can be modified and

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thus the amount and rate at which the runoff will be available can also be managed. It should be understood that there is no package of practice that can be universally applied. Those measures which will be of relevance to the particular area only should be recommended.

The question of cost, stability, loss of area and problem in the maintenance of bunds have been the subject of debate for a long time. The present feeling is to avoid large section bunds and replace them by small sized graded bunds. It is realised that conservation is not complete without smooth disposal of surplus water and land development in the inter-terraced area.

The principle behind the recommendation of different practices is to increase the infiltration by reducing the rate of runoff, temporarily impounding the water on the surface of soil to increase the opportunity time for infiltration and modifying the land configuration for interplot water harvesting. Other practices include improving the soil physical conditions so as to increase the rate of infiltration and retention in the soil system. Adoption of practices suitable for the local situations help to improve the soil moisture availability and thereby achieve higher crop yields.

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TEA CULTIVATION IN NON-TRADITIONAL AREAS

G. VENKATESWARAN*

Tea is generally grown in the hilly areas of traditional south and north-east Indian States. Tea plantations have been expanded year after year in and around in these areas. The soil and climatic factors have been conducive for the cultivation of tea in these areas. Dissemination of scientific research findings have helped to improve the productivity over the years.

As tea consumption is increasing year after year, domestically and globally, there is a need to improve tea production and productivity. While expanding tea cultivation in the traditional areas has been difficult, exploring non-traditional areas for tea cultivation assumes significance.

For a successful cultivation of tea, the following are important :

a) **Soil :** Acidic soil with a pH between 4.5 and 5.0.

b) **Soil depth :** Minimum root penetrable depth of 1.5m to 2.0m.

c) **Drainage :** Adequate facility for drainage.

d) **Temperature :** Optimum ambient temperature range of 18 to 30°C.

e) **Rainfall :** Well distributed minimum annual rainfall of about 150 cm over a period of 8 to 9 months.

f) **Relative humidity :** Preferably around 80 per cent most of the time.

There have been instances in the past, where feasibility of tea cultivation in non-traditional areas had been studied. Possibilities of growing tea in the hilly regions of Gujarat, Maharashtra and Orissa have been explored. Some soil and climate parameters were found to be out of the optimum range in the non-traditional areas. In such cases, amending them to the optimal level, should be looked into provided the whole operation is economically viable.

Salient features about the hilly tracts of the non-traditional areas are given below :

a) Amboli Ghat, Sindhudurga District, Maharashtra

Soil : Strongly acidic soil (5.0 to 5.5). Lateritic brownish red, clay loam to loamy with moderate to poor moisture retention. Soil depth varies from 0.5 to 1.5m.

Climate : Altitude ranges from 650 to 750 metres. Receives between 600 and 700 cm of rain predominantly during south-west monsoon period (June to October). Negligible rainfall during November. Prolonged dry spell for 6 months (December to May). Relative humidity very low. Prone to heavy wind during July/August.

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b) Gopalpur, Kalahandi District, Orissa :

Soil : Lateritic, clayey to clayey loam. Soil depth varies from 0.3 to 3 metres. Soil reaction in the strongly acidic range (5.0 to 5.5).

Climate : Altitude ranges from 750 to 900m. Receives annual rainfall around 220 cm predominantly during south-west monsoon period (June to September). Experiences very hot weather during summer months with the temperature exceeding 40°C (Mid-March to Min-June). Protracted drought for six months. Very low relative humidity.

c) Surat, Dang & Valsad Districts, Gujarat :

Soil : Lateritic, with adequate depth. Soil reaction ranges from strongly acidic to mildly acidic (5.0 to 6.5).

Climate : Altitude ranges from 200 to 800 metres. Annual rainfall ranges between 114 cm and 244 cm received predominantly during south-west monsoon period (June to September). Experience very hot weather. Very long drought for six to eight months.

Analytical data of soil samples from non-traditional areas showed that the reaction (pH) is strongly acidic to mildly acidic, which could be amended suitably. Other nutrient status could be improved as and when needed. While soil factors are nearly satisfactory, the climatic conditions are hostile. The duration of drought is long. Possibilities of irrigation in the non-traditional areas could be explored based on the availability of water to get over the drought problem. Since the temperature during dry weather is above 35°C, photosynthetic rate is likely to decline with possible damage to foliage. The relative humidity is generally low. Establishment of shade trees mitigates the adverse effects of high temperature and the relative humidity.

Tea cultivation in the non-traditional areas seems to be relatively difficult from the point of achieving economic yield levels. Therefore, small areas may be planted on experimental basis and agro-techniques systematically applied to evaluate the response of tea in the new environment. Information generated from such trials could form the basis for making decisions of a commercial nature.

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PROCEDURE FOR DRAWAL OF SAMPLES OF FERTILISERS/CHEMICALS

D.P. VERMA*

1. SAMPLING FERTILISERS/ CHEMICALS (SOLID)

1.1. General requirements of sampling :

In drawing samples, the following measures and precautions should be observed :

a) Samples should not be taken at a place exposed to rain/sun.

b) The sampling instruments should be clean and dry.

c) To draw a representative sample, the contents of each bag selected for sampling should be mixed as thoroughly as possible by suitable means.

d) The sample should be taken in a new 0.13 mm of polythene bag and sealed properly. This should be put in a cloth bag and labelled properly.

1.2. Sampling from bagged material

a) Scale of sampling

All bags in a single consignment of the material of the same grade and type drawn from a single batch of the manufacture shall constitute a lot. If a consignment is declared to consist of different batches of manufacture, all the bags of each batch shall constitute a separate lot.

Sample should be taken for each lot for ascertaining the confirmity of the material to the requirement of the specifications.

b) Selection of bags for sampling

The number of bags to be chosen from a lot shall depend upon the size of the lot as given in the table below :

Lot size (No. of bags) (N)	No. of bags to be selected for sampling (N)
Less than 10	1
10 - 100	2
100 - 200	3
200 - 400	4
400 - 600	5
600 - 800	6
800 - 1000	7
1000 - 1300	8
1300 - 1600	9
1600 - 2000	10

All the bags of a lot should be arranged in a systematic manner, start counting from any bag randomly, go on counting as 1, 2, 3 . . . . up to r, where r is equal to the integral of N/n. Thus every rth bag counted shall be withdrawn and all bags shall constitute the sample bags from where the sample is to be drawn for preparing a composite sample.

If the procedure given above is not possible to be adopted, the sample should be drawn from the randomly selected fertiliser bags from different layers, from top and from all open sides in a zig zag fashion.

1.3. Preparation of composite sample

If the composite sample collected from the different selected bags is larger than about 1.5 kg in weight, its size shall be reduced by method of quartering as detailed below :

Spread the composite sample on a level, clean, hard surface, flatten it out and divide it into four equal parts. Remove any diagonally opposite parts. Mix the two remaining parts together to farm a cone, flatten out the cone and repeat the operation of quartering till a composite sample of about 1.5 kg weight is obtained.

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1.4. Preparation of test sample and reference sample

The composite sample obtained above shall be spread out on a clean hard surface and divided into three approximately equal portions of about 400 g each in weight. Each of these samples shall constitute the test samples and should be properly labelled. One test sample may be sent to laboratory for a analysis and another sample may be given to the dealer and third sample may be retained as reference sample.

1.5. Sampling for mixed fertiliser

In the mixed fertiliser materials, however thoroughly they may be mixed, there is bound to be a certain degree of heterogenity in the distribution of components. Besides, that the partial segregation of components occurs due to differences in particle size and density, during handling and transporting. The segregation takes place only along the sides, when transported in bags which are arranged flat and the effect of segregation will be felt only in the ends with the middle portion attaining a dynamic equilibrium. Hence under such case samples should be taken from the middle portion for analysis.

2. PROCEDURE FOR DRAWAL OF SAMPLES OF PESTICIDES/CHEMICLS (LIQUID)

2.1. General requirement of sampling :

Before drawing the test samples, mix thoroughly the contents of each container selected, by agitation or any other suitable means so as to bring all portions into uniform distribution. The samples should be taken immediately after stirring with the help of scoop having long handle to reach the bottom of the container in the slanting position.

2.2. Scale of sampling :

All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

Sample should be tested from each lot for ascertaining the conformity of the material to the requirement of the specifications. The number of containers to be selected from the lot shall depend on the size of the lot and shall be in accordance with the following table :

Lot size (N)	No. of containers to be selected (n)
3 - 15	3
16 - 40	4
41 - 65	5
66 - 110	7
111 & above	10

These containers should be selected at random from the lot.

2.3. Random sampling :

Starting from any container in the lot, count them as 1, 2, 3 . . . r in one order where r is equal to the integral part of the value N/n, where N being the total number of containers in the lot and, n the number of containers to be chosen. Every rth container thus counted shall be separated until the requisite numer of containers is obtained from the lot to give the samples for test.

2.4. Sampling method :

Mix thoroughly all the material drawn from the same container. A small but equal quantity shall be taken from each selected container and shall be well mixed together so as to form a sample of not less than 450 ml. This sample shall be divided into three equal composite test samples, one for the analytical laboratory, another to be sent to the dealer and the third to be retained as reference.

The withdrawn sample material shall be immediately transferred in dried clean plastic bottle, which are then sealed air-tight with stoppers. The plastic bottle shall be closed with a tight inner stopper and if required sealed in the neck of the container by means of suitable sealing composition. The containers shall then be marked with full details of sampling and the particulars of consignment.

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UPDATE UPASI UPDATE UPDATE

(CONTAINING DEVELOPMENTS DURING NOVEMBER 1995)

COMMITTEE MEETINGS

☆ Trustees : Bangalore : 6.11.1995.

☆ Executive Committee : Bangalore : 6.11.1995.

☆ Labour Liaison Committee : Kochi : 18.11.1995.

☆ Joint Meeting of Tea Committee and Tea Technical Committee : Kochi : 27.11.1995.

☆ Trustees : Coonoor : 29.11.1995.

TEA EXPORTS TO RUSSIA

The Export Credit Guarantee Corporation of India Limited (ECGC) has informed that as per their present underwriting policy, exports to Russia are covered by them on case-to-case basis if the transaction is backed by irrevocable letter of credit opened by one of the banks listed below. Transactions worth around Rs. 80 crores on the above terms had been provided with ECGC cover in the last 18 months. This underwriting policy has been arrived at giving due consideration to ECGE's role as an Export Promotion Organisation without sacrificing its prudency as a credit insurer.

(**List of Banks :** Bank for Foreign Trade of Russia (Uneshtorg Bank), Bank for Foreign Economic Affairs, International Moscow Bank, Promstory Bank, East-West Investment Bank, Incomebank, Mosbusiness Bank, Toko Bank, Sberbank, and Imperial Bank).

SALE OF FLAVOURED TEA

The Tea Board has prescribed certain guidelines for registration as a manufacturer of tea with added flavour. The details have already been circulated to tea members.

COFFEE CONFERENCE

The UPASI-KPA Coffee Conference was held in Bangalore on 6th November 1995. Mr. K.P. Uthappa, Chairman, KPA welcomed the delegates. Mr. S. Samuel, President, UPASI provided the introductory remarks. Mr. Philipose Matthai, Chairman, Coffee Board spoke on "Outlook on Coffee — Indian Situation & Global Scenario", Dr. L.K. Vaswani, Managing Director, COMARK spoke on "Coffee Marketing in the changed scenario", Dr. R. Naidu, Director, CCRI delivered a talk on "Ways and means of increased production and productivity of coffee" and Dr. C.S. Srinivasan, Jt. Director, CCRI on "New Strains of Coffee", Mr. Shireesh Gurjer, Vice Chairman, KPA proposed the vote of thanks.

INTERNATIONAL COFFEE CONVENTION

The International Coffee Convention, to be jointly organised by the UPASI and the Coffee Board, has been postponed from 11-12 January 1996 to 7-8 May 1996. The venue remains the same namely Bangalore.

FREE SALE QUOTA

The Coffee Board has informed that, for the 1995-96 season, 100 per cent FSQ has been allotted to growers holding less than 10 hectares and 70 per cent FSQ to the other coffee growers.

Meanwhile, UPASI is pursuing its representation that 100 per cent FSQ be granted to all the growers, irrespective of the size of the holding.

INITIAL PAYMENT

The Coffee Board has informed that the initial payment for 1995-96 season for coffee pooled with the Board has been enhanced from Rs. 25 per point to Rs. 31 per point to both large and small growers.

SEMINAR

A seminar on "Eco-friendly Cultivation of Tea" was organised by UPASI-KVK on 17th November, 1995 at UPASI Campus. It was inaugurated by Mr. D. Ravindran, Secretary General, UPASI, Mr. T. Rangaiah, President, Nilgiris Small Tea Growers' Association, presided over the function. Theme papers were presented by Dr. A. Abdul Kareem, Director, UPASI-TRI, Dr. N. Muraleedharan, Joint Director, TRI, Dr. V.G. Dhanakumar, Principal & Chief Training Organiser, UPASI-KV, Dr. D.P. Verma, Senior Soil Chemist, TRI, Dr. B. Chandra Mouli, Senior Plant Pathologist, TRI, Mr. M. Surendra Mohan, Zonal Manager, T. Stanes & Co. Ltd. and Mr. J. Halan, Senior Manager (Technical), TANTEA.

WAGE NEGOTIATIONS

After the expiry of the last PLC Settlement on wages in Kerala on 31st March 1995, negotiations were in progress for revision of labour wages. However, at the last PLC meeting held on 17th November 1995, there was a breakdown of negotiations. Subsequent to this, on 19th November 1995, the Government of Kerala brought out draft proposals for revision of minimum wages in plantations with retrospective effect from 1st April 1995. The draft proposals will be taken up for consideration on or after 20th January 1996 by the Government after taking into account the objections and suggestions received. If the proposals, as they stand now, become effective, the wage increase in the case of an adult worker from 1st April 1995 in tea/coffee/cardamom plantations will be Rs. 5.35 per day and in rubber plantations Rs. 6.34 per day. The other features of the notification are revision of the D.A. scheme, provision for service weightage, increase in incentive and job differentials, revision of wages of monthly paid employees, etc.

As regards Tamil Nadu, the current wage settlement is valid till the end of December 1995. PAT already had two rounds of talks with the unions.

The estate staff salary is also due for revision from 1st January 1996 and the UPASI Labour Liaison Committee had one round of talks with the ESUSI on 18th November 1995. Next round of talks is to take place shortly.

EMPLOYEES' PENSION SCHEME 1995

The President of India has promulgated an Ordinance on 16th November 1995 amending the Employees' Provident Funds & Miscellaneous Provisions Act, 1952, so as to provide for the introduction of the Employees' Pension Scheme, 1995 in place of the Employees' Family Pension Scheme, 1971. The new Pension Scheme takes effect from 16th November 1995 and it covers all existing members of the Family Pension Scheme, 1971 and those employees who were not members of the Family Pension Scheme but who opt to become members of the new Pension Scheme.

A Pension Fund has been created by transferring the amount standing to the credit of the Employees' Family Pension Fund as the corpus which will be further funded by diverting 8.33 per cent of the employer's contribution to the Provident Fund. The Central Government will also contribute at the rate of 1.16 per cent of the pay in respect of each member. From the Fund, different kinds of pensions will be disbursed like superannuation pension, retirement pension, short service pension, widow/widower and children pension, etc. The formula for calculating the monthly pension is

$$\frac{\textbf{Pensionable Salary x Pensionable Service.}}{\textbf{70}}$$

where —

> 'Pensionable Salary' is the average monthly pay drawn during the 12 months preceding the date of exit from the membership of the Pension Fund. The maximum pensionable salary is limited to Rs. 5,000/- p.m. 'Pensionable Service' is the service rendered by a member of the Pension Fund, for which contributions have been received. In effect, this will be the service rendered from 16th November 1995. In respect of 'past service', i.e. service rendered by an existing member from the date of joining the Employees' Family Pension Scheme till 15th November 1995, a past service benefit, linked to certain blocks of past years of service is provided.

PERSONALIA

At the Annual General Meeting of KPA held in Bangalore on 7th November 1995, Mr. Shireesh Gurjer was elected Chairman and Mr. S.A. Mohsin, Vice Chairman for the year 1995-96.

UPDATE | UPASI Update | UPDATE

PRICE TREND (Rs./Kg.)

CROPS	LATEST		6 MONTHS AGO		YEAR AGO	
TEA	C.T.C.	ORTH.	C.T.C.	ORTH.	C.T.C.	ORTH.
COCHIN	51.16	49.64	37.23	39.49	35.21	37.72
COIMBATORE	48.50	51.24	35.98	39.91	29.65	35.30
COONOOR	48.61	48.47	36.25	32.24	25.54	32.05
AVERAGE	49.71	49.88	36.65	37.56	30.60	36.00
COFFEE						
a) ICTA Auction						
PLANTATION A	76.28		114.80		118.60	
ARA. CHY. AB	73.86		100.44		113.01	
ROB. CHY. AB	NO SALE		94.44		102.27	
RUBBER						
a) Kottayam						
RSS LOT	41.80		59.80		29.25	
RSS IV	48.50		61.60		31.00	
b) Kuala Lumpur						
RSS 1	45.66		58.62		40.24	
SPICES						
CARDAMOM	198.93		220.36		269.23	
PEPPER	72.75		83.50		79.00	
CLOVES	100.00		90.00		90.00	
NUTMEG	95.00		100.00		95.00	

TEA CROP - SOUTH INDIA - (TONNES)

OCTOBER

1995 : 20,538
1994 : 16,688
1993 : 19,158

JANUARY to OCTOBER

1995 : 152,560
1994 : 154,208
1993 : 147,213

ACC No. ~~5512~~

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